

PT 7

The other terminal for IBM and ICL mainframes

FERRANTI

NEWS IN BRIEF

DoE reply on US minis.

ONE of the two MPs who wrote to the Department of Employment about its purchase of US-built minicomputers and printers from Interdata rather than Digico for disseminating job vacancy details in London and Glasgow (CW, August 11) has received a reply from the DoE.

In its letter to John Wakeham, Tory MP for Maldon, Essex, the DoE pointed out that Interdata's parent company, Perkin Elmer, has manufacturing establishments in the UK which employ about 700 people building laboratory equipment.

French Bill

THE draft Bill on data protection prepared by the French Cabinet last year (CW, July 22, 1976) is now being scrutinised by the French law commission. The Bill will be presented to Parliament early next month.

TSB finalists

FINALISTS for the major contract to replace the 2,000 or so terminals used by the Airtouch Group of Trustee Savings Banks are resident supplier Olivetti, together with Burroughs, Dataseab and Philips. Univac is to supply an 1100/82 mainframe to replace the ICL System 4 mainframes at the centre of the network (CW, April 7).

Japan sells to Iraq

JAPANESE sources say that Toshiba has sold a mid-range Acos 77/800 mainframe to Iraq. The Acos 77 line is based on Honeywell Level 66 licences, and the 800 is comparable in power to a 66/40 or 66/80. The sale suggests that Toshiba is prepared to compete with Honeywell in the Third World countries.

REDEMPTRIST PUBLICATIONS of Chawton in Hampshire, Catholic publishers and booksellers, are pleased to report the installation of a B.C.L. Molecular 18 Mk 111 computer that has been delivered exactly on time and in accordance with contract.

The Management Board of Redemptorist Publications, who have been previously using a V.R.C., wish to express their sincere and grateful thanks to BUSINESS COMPUTER (SYSTEMS) LTD., of Portlaine in Sussex for the way and manner in which the equipment has been installed and commissioned; their experience and professionalism has resulted in a total problem free start. Our thanks also go to B.C.L. for the time and energy that has been spent in determining our software needs and upon the work completed on the system design and programme specification—in our experience this has been superb!

INDUSTRIAL MAINTENANCE SERVICES is also thanked for the excellent job that they did in preparing our accommodation.

A lesson for all FIRST TIME users of computer users is that you will have to go a long way to better this experience!

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Who cares about computers?

THE general public is overwhelmingly indifferent to computers and their effect on everyday life. Or, at least, the French public is. For in a survey by the French monthly magazine Ordinateurs, well over half those interviewed were "don't knows" when questioned whether computers were useful, useless or dangerous in areas like education, medicine and privacy.

The first two questions were aimed at finding out how familiar people were with computers, and the answer was "not very." Only 7 per cent said they had seen a computer working, 54 per cent said they had not, 17 per cent thought they had, and 22 per cent did not know. More had seen a terminal, but here again it was only 14 per cent.

Ordinateurs wondered if many of the "horror stories" said about computers were merely due to the fact that few people knew what one looked like.

The next two questions covered the use people made of computers at work. Only three per cent said they had anything to do with computers every day, and seven per cent said they were involved frequently. A massive 81 per cent said "never" or "don't know."

More than half were again "don't know" when asked if computers were useful to their job. About 18 per cent thought computers were useful and 14 per cent useless. The survey found that younger people tended to think the computer was useful, while the older ones tended to think of the computer as a threat to their jobs.

The two per cent who thought computers were dangerous were mainly women.

A high percentage, 74 per cent, answered "never" and "don't know" on the question of whether their private lives were affected by computers. But 13 per cent said they were affected, giving computer printed bills as

examples. And only seven per cent thought computers useful in their private lives while 23 per cent thought them useless. The majority, again, were indifferent.

The last four questions concerned the effect of computers on different areas of life. Computers were seen as useful to humanity by 23 per cent, and useless by 10 per cent; seven per cent thought them useful in health, six per cent useless and seven per cent dangerous; and nine per cent thought them useful to education, 18 per cent useless and 11 per cent dangerous.

Ordinateurs summed up the survey saying, "We must humbly conclude that the public is little concerned about computers. This is normal, but at the same time worrying: normal because the computer is only a tool, worrying because public ignorance could allow the growth of dangerous ambiguities such as those already surrounding nuclear energy."

OECD call to control data use

THE emphasis of legislation protecting personal data should be on the use of the data rather than the actual processing. This view was put by UK speakers at an international conference on trans-border data flow, organised by the Organisation for Economic Co-operation and Development in Vienna last week.

"The collection and storage of personal data, of itself, harms no one: only when it is used should we become concerned," said David Firnberg, director of the National Computing Centre. "Therefore it is at users that legislation should be directed."

Alan Benjamin, director-general of the Computing Services Association, said control of the use of data gave protection against unauthorised new uses, provided protection regardless of where the work was done and, above all, was enforceable.

Benjamin called for the setting up in each country of a statutory body which would issue licences to end users for specific uses of data.

Benjamin added that the authority should also grant certificates of security to organisations running computers. But, he went on, "Laws which attempt detailed regulation in a fast developing environment will be subject to technological loopholes."

One reason for having a licensing authority was that the general public would find such a body reassuring, said Benjamin.

Firnberg said that it was vital for countries to reach international agreement on data protection legislation.

"But legislation for controlling disclosure of data varies enormously from one country to another. This will become a major obstacle to data flow and communications unless we can harmonise national programmes and agreement on international standards."

Harmonisation is certainly needed to support one of Benjamin's suggestions: "Before issuing a licence to a user, the data protection authority shall be required to satisfy itself that the processing will be carried out to an acceptable level of security. In this task the authority may accept the assurance of quality from the data protection authority in the country where the processing is carried out."

Now that the computer industry has aired its views, the Council of Europe is meeting this week to consider a draft international treaty which could lead to certain minimum protection standards around the world.

Northants Bureau team wins CW five-a-side cup

WE are the champions... This team from Northamptonshire Computer Bureau won the Computer Weekly Cup in a five-a-side football knock-out competition for teams of data processing staff from installations in Northamptonshire.

In the first round, played on a league basis, Northamptonshire Computer Bureau beat British Timken 2-0 and drew with Crane

1-1. Crane drew with British Timken. Northamptonshire Computer Bureau beat Anglia Building Society 2-1 in the quarter final and Avon Cosmetics 2-0 in the semi-final.

The final was a 7-1 rout of Hamlyn.

The cup was presented by Billy Best, player of the year at Northampton Town. The team was (back row) Dave Farrer, John Archer and Paul Gagan, and (front row) Phil Mackay and John Davies.

The competition, which attracted 23 teams, was organised by an Avon programmer, Alan Rance. Our thanks to him.

CII-HB to build Level 6

IN what is seen in part as a defensive move against possible nationalisation of CII-Honeywell Bull in France, Honeywell is planning to extend the power of the Level 6 minicomputer line to match most of the French-built Level 64 series. The company plans a Level 6/30 series, which like the 6/30 and 6/40 will have substantial software compatibility with the US and Scottish-built Level 66 mainframe line.

Meanwhile CII-Honeywell Bull has announced that it is to manufacture the three models in the 6/30 and 6/40 lines at its Belfort factory. CII-HB has a substantial multi-year contract for minis with the leading French manufacturer SEMS, but the decision to build the US-designed minis in France will make it harder not only for SEMS but also for the other French minimakers, Intertechnique and SFENA.

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Ironman's double blow for UK

CONTRACTS for the development of prototype computers by the US Department of Defense planned standard real time language have been awarded, with a double disappointment for the UK.

Three of the four contracts have been awarded to US-based developers, with one in the direction of Europe. The UK's last candidate for a base language, Algol 68, has been effectively excluded.

Following publication of the "Ironman" specification, very ideal features for a real time language to be used in the US and services, the DoD selected PL/I and Pascal, to serve as base for the planned language and requested detailed proposals (CW, March 24).

Unexpectedly, all proposals selected for implementation were based on Pascal. The successful candidates are CII-Honeywell Bull, the Stanford Research Institute of California, and Softech and Intermec, two software houses with a standing record of work for government departments.

Pascal is a highly structured, Algol-related language, developed by Niklaus Wirth, Zurich on the basis of collaboration with the Professor Tony Hoare.

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Briefing

Joint CDC-Soviet project

THE Soviet Union has agreed to accept an offer from Control Data for the joint development of an advanced scientific computer. The agreement was made following a conference at the Academy of Sciences in Leningrad, which is the centre of the project.

According to Soviet computer expert Professor Mikhail Ignatiev, this system is to be built on "new technological principles" that could greatly outperform existing systems. He calls it a "recursion computer."

The proposal is likely to be closely scrutinised by the US government, which recently vetoed a bid by CDC to sell a Cyber 76 to Russia.

More on CDC in Russia — page 40.

One-day strike

A ONE-DAY token stoppage by ASTMS members at Laporte Industries, Redhill, last week followed the non-payment of an agreed 5% Phase 2 increase. A company spokesman said that the payment was delayed because of staff illnesses in the DP department, but added that agreed back-pay would be fully paid at the end of this month.

2350 pre-sell

FORMAL announcement of the 2350 is expected by the end of November. It is understood that ICL is already pre-selling the system in international markets, including South Africa.

Cim go-ahead

THE recent multi-machine order for GEC 4080s from University College, London, has been followed with two more significant GEC sales, including one to the south western universities which have just received the go-ahead for a £1 million interactive system to replace existing ICL System 4 machines. (See page 3.)

Peripherals launch

A COMPLETE range of peripherals for IBM Series 1 minicomputers is to be introduced by Control Data within the next few months. The range will include matrix and line printers, teletype terminal, disc drives and memory.

Hello v NP

THE new British Othello champion, Joseph Woch, takes on a Hewlett-Packard computer at the game this weekend. Peter Woch, who teaches programming in the mechanical engineering department at University, has written a program in Basic for a Hewlett-Packard 9830 and for a 2000, says the computer always beats the beginner.

Database put down

LARGE scale database software is never economically justified, according to GIB's mythology. (See page 6.)

Whither the BCS?

Malcolm Paterson (see page 2) has been asked to resign as President of the British Computer Society. He says he would not resign, but would accept the BCS should die. (See page 2 and 15.)

The micro era

THE micro era could hold up microprocessor progress according to GIB's mythology. (See page 6.)

Also

Focus on small systems... £1m for universities... Downside... Donald Michie's Chess... New CBA president... Latest in computer crime... Puzzler... Software File... Programmer Notes... People in the News... Diary notes... Op Spot... United Policy on privacy... Letters to the Editor... Microprocessor news... Interview with new BCS chief... Viewdata open to competition... 40

APPOINTMENTS

PAGES 19-39

Number 570

Thursday, October 6, 1977

Price 18p

Tektronix diversifies

MOVING for the first time beyond the provision of hardware, Tektronix has introduced a Finite Element Modelling package that can be run either online or offline from a host computer, and can format model data into a compatible form for its finite element analysis software available.

Developed to run resident on the company's 4081 interactive graphics terminal (CW February 3), the package has been designed specifically for applications in structural analysis in mechanical and civil engineering. Called FEM 181, it can operate in any one of four modes: as a dumb terminal operating directly online to a host computer, as an intelligent terminal, as a workstation operating offline except for number crunching, or as a stand-alone, with no interaction with a host computer.

The package is constructed in three main sections. The first is a data loader, which allows the loading of an existing bulk data file from a host computer or other source for editing purposes. The second section is the model generator, which allows node and element generation and editing in three dimensions, and the third is a bulk data formatter, which allows model data to be formatted into a card image file that is compatible with the particular finite element analysis package to be run.

Without recourse to a host computer, the package allows the user to rotate through three axes, zoom in or out on assigned sections, produce cross-sections, and produce hard copy print-outs of the display. It is also possible to obtain a status report on the modelling process at any time.

Our picture shows FEM in action on the Tektronix 4081 system. It is being applied to turbine blade design with three dimensional rotation.

ICL staff rush for shares

STAFF at ICL have firm faith in the company, judging by the number of applications for shares.

The company is offering 12,000 staff 2.5 million shares, or 17% of the issued share capital, over five years (CW, August 18) and when the first million were offered there were applications from 3,675 staff for 1.8 million shares.

This rate of response is believed to be much higher than any other industrial company has experienced in similar schemes.

The shares were offered on August 25, when ICL shares were worth 201p. On Monday of this week the shares stood at 248p.

COMPUTER WEEKLY'S INSIDE NEWS

IN TOP GEAR

Racing driver Davie Galles (pictured right) and boxer Henry Cooper will be vying for attention with the latest systems and equipment for the automated office at the International Business Show in Birmingham next week. Computer Weekly goes into the office of the future and provides a taste of IBS things to come. Pages 16/18

DATABASE PUT DOWN

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WHITHER THE BCS?

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THE MICRO ERA

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MPs call for benefit fiddles check

A CALL for greater use of computers to cross-check social security information has come from a watchdog body of MPs in an investigation of overpayments of £10.8 million social security benefits in 1975-76.

The Committee of Public Accounts, in its report on the overpayments, says the main safeguard against fraud and mistakes is a check of details given by benefit claimants.

"We stress the importance of taking all reasonable steps to ensure that there are no categories of cases where appreciable and avoidable overpayments are occurring. We therefore urge the departments to pursue their investigations to ensure that full advantage is taken of the facilities offered by computers to cross-check and supply information to the point at which a claim is decided."

RESULTS OF CW SURVEY...

Doubts on IBM sales boom

THE anticipated sales boom in medium/large-scale IBM-compatible mainframes and the new IBM 3033, 3032 and 3031 systems, could be smaller than expected in the UK — at least for a year or two. That is the broad conclusion of a Computer Weekly survey of a dozen large-scale IBM users, taken just before this week's expected public announcement of the 3032 and 3031X (CW, September 29) and news of the first UK order for the Iel Advanced System range of IBM processor replacements (see below).

The 3032 and 3031 are expected to be announced this week after Computer Weekly has gone to press.

The 3030 series of machines appears to have arrived at the

wrong moment in the development cycle of most of the installations contacted by Computer Weekly, and, at this stage, none would go on record as saying that they were planning to place an order, even just to get in the queue.

Lloyds Bank placed an order for four 370/188s about two years ago, and took delivery of the second two earlier this year. As a committed IBM user, the bank might have been expected to switch its 188s to 3033s, but has no plans to do so for some time.

"We are in the middle of a monumental transfer plan with the move into our new Bankside computer centre, and we won't be looking for any change of mainframes for at least two years," said a spokesman.

"When we do start looking,

we will be looking for a 370/158-3, early in 1978.

The initial configuration will have a two Megabyte main memory and 16 200 Megabyte Iel disc drives. UCSL says that its decision to buy from Iel was based principally on cost/performance, and involved extensive comparative studies. UCSL said that it was interested in IBM's 3032 replacement for the 158 but was not prepared to wait for delivery.

UCSL already has three IBM 360/65 mainframes, one at Burgess Hill and the other two at its Watford centre. None of these will be replaced by the Iel system.

Turn to page 11

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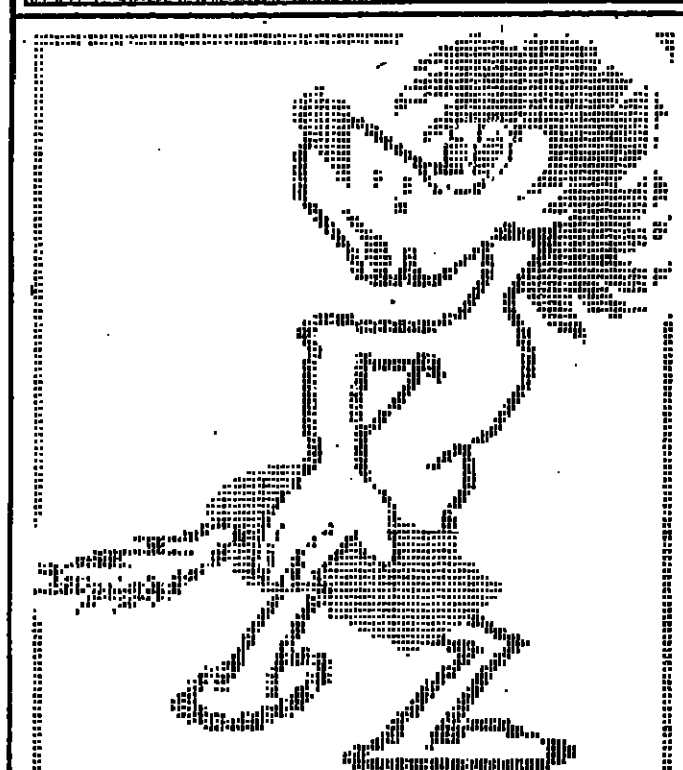
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DOWNTIME



MY RUSSIAN

MY Russian is non-existent, but I'm told the warning on the above printout, produced for Malcolm Peltu by an M-4030 when he visited the International Engineering Exhibition in Brno, Czechoslovakia, reads, "Watch Out!"

It is, I'm relieved to say, the only example of computer graphics using the Cyrillic alphabet to come my way since I asked for examples on August 25.

My thanks to all those readers who responded — my office could be papered with the samples sent, although not (for lack of space) this column.

I was interested to learn that Bristol University's computer centre has a library of over 100 such pictures, and aims to build a comprehensive collection. Steve Fisher, senior operator at the centre, writes that his group would be pleased to be in touch with anyone who can supply source programs for further pictures (the university's mainframe is an ICL System 4/75, which is networked with other universities' System 4s and the 2880 at Bath), and would pass such information to others. The group is also compiling a library of computer games, and would welcome additions. Steve's address is: University of Bristol Computer Centre, University Walk, Bristol.

Program automation: End this neglect

IN response to Computer Weekly's Call for Action I strongly endorse the proposal for a task force to retrieve something from the mess.

Clarion calls always carry a risk that the good citizens may rush out of doors and, each mounted on his own mettlesome hobby-horse, gallop off in every direction except where the trouble is.

The location of the present disaster area is too obvious for that, namely in the Land of Myopia commonly referred to as Whitehall. Shirley Williams' recent feat of producing a 54-page Green Paper on Education with no mention of the word "computer" is one small straw in an ill wind.

The UK has the traditions, the skills, the brains, and the know-how to recapture world leads in computing and software. These knowledge-intensive sectors of our culture and economy are precisely suited for concentrated treatment by a country which is small and poor, yet still enterprising in outlook.

Thus far, I am sure, we are all agreed. The question is: are these potential assets frequently/sometimes/never sent to hell in a basket by the caprice and obtuseness of bureaucrats?

A. M. Cox of Ferranti was right to call attention (CW, August 25) to the fact that UK firms are still to be found in the front wave of new developments. It should also be noted that excellent things have recently been done by individual government agencies, such as NRDC and the National Enterprise Board's consortium, Inspec.

But it is wrong to conclude that the "conceived in the UK, made elsewhere" pattern is not a real problem. My experience over years of professional activity in the potentially applicable field of machine intelligence is that it is precisely at certain sensitive transition points along the line from conception to production that official obscurantism wreaks the deadly havoc.

Taking time out from his normal Privateview column, Professor DONALD MICHIE takes up the recent Computer Weekly call for action to create national policies on the development and impact of information technology. Here he argues for the establishment of vigorous national R&D effort.

I received a painful reminder the other day at breakfast when my eye fell on a full-page colour advertisement from General Motors headed:

A COMPUTER THAT CAN SEE GETS ITS FIRST REAL JOB

Four years ago I had responsibility for a fine team of gifted young computer scientists who had just achieved goals in robotics widely judged impossible in relation to constraints of time and resources.

General Motors, hearing of this, borrowed the film record which we made of the Edinburgh versatile assembly system. At about the same time our government sponsor suddenly terminated all support, and the team had to be disbanded.

It is clear from the colour ad that General Motors over the intervening four years have faithfully followed our trail, transforming into cost-effective implementation an academic exploration of machine "teachability" as a programming short-cut. Unfortunately General Motors is not a British firm.

The said government sponsors even managed to mis-identify the FREDDY project as an exercise in manufacturing technology instead of in computer science. It may therefore be of interest to spell out the place of such work, as I see it, in the technical scheme of things.

Machine intelligence is directly and inescapably involved in the automation of programming skills. It is of course only one of the critical areas from which progress in the automation of programming may be expected.

In the past, disciplines such as compiler design and program

semantics have justly claimed the lion's share. But the user of the future will not be satisfied to specify his solution in Cobol or Fortran and have only the machine-coding automated.

He will demand to be lazy and specify his problem only, plus hints at a solution — approach, with a few examples and a body of general facts about the problem-domain. Then he will expect Super-compiler to generate him a good solution in, say, Fortran.

As Super-compilers move to the centre of things, mainstream machine intelligence techniques will have an increasing role to play in their design. I am currently working on ALI, a Super-compiler for chess. In end-game trials a two-month programming task was done in two days and a task widely thought to be "unprogrammable" was done in six weeks.

As with manufacturing/ computing confusion instanced earlier, we again encounter one of the more persistent delusions which buzz inside the bonnets of government administrators of scientific research.

These persons need to discover whether as the taxpayer's agents they should love, hate, or merely giggle at this or that experimental programming study. Procedure follows the rule: (1) ascertain the program's test-domain; (2) adopt attitude accordingly.

To caricature the rule, if it is a picture-processing program the test picture may be of members of the Royal Family (love), or of notorious dictators (hate), or of the characters in Winnie the Pooh (giggles). If the program drives a robot, then it is industrial automation (love), but possibly someone else's — (try Department of Industry), and if it plays chess it is a frivolous evasion (giggles).

The logical end is that nothing at all gets classified as computer science, unless the subject domain is so inconspicuous as to escape detection, thus letting computation theory in under the wire.

The scientist, on the other hand, knows that the experimental task chosen is orthogonal to the principles to be elucidated. A robot might learn recognition rules from sample TV views of engineering parts, and a chess program might learn strategies the winning line.

The discrepancy between the defensive strategy implemented in Thompson's database and the strategy recommended in the books is easy to explain.

The database strategy has been generated under no other constraint than that it be objectively optimal, ie that it maximise the length of the forcing path leading to defeat.

The book strategy, on the other hand, has been prepared under the constraint of an added requirement, namely that it be feasible for a human to memorise, and also not require excessive calculation for its application in across-the-board play.

Could there be a machine methodology for generating strategies for humans? Later Chesslabs will return to this intriguing topic.

from sample positions. If the two use the same fundamental mechanism, then they constitute one and the same contribution to the automation of programming.

Imagine that early R&D in support of telecommunications had been monitored by assessors according to the content of conversations tapped from the telephone wires: "We can't support this, I distinctly heard some very rude words." "Well, ... but very beautifully spoken!" thought ... and so on.

Merrick's telecommunications research was judged into the US important enough to merit the same and protected environment of properly regulated research institutes, and R&L Laboratories among others was born.

Now in the new wave of computing technology, major institutes for advanced computing have been established in the US and some existing institutes, such as Bell Labs themselves, have become pre-eminent also in the new disciplines.

In the UK what is the score? The score for the entire country is precisely zero. For a few years SRC's Atlas Computer Laboratory seemed to tremble on the brink of developing in this much needed direction. But readers of Professor David Barron's recent obituary of that laboratory (IUC Newsletter vol 5, no 4) will know that opposition to a freestanding national research effort in computing is deeply entrenched.

There seem to be about British software and systems houses to come together into a joint overseas marketing spearhead. There are even experienced research men willing to form an R&D spearhead which could carry out ahead of the Americans, excepting the Americans and Japanese, in the critical area of software automation and related skills.

Since the total cost of programming to the nation is approaching the amazing figure of £1,000 million a year, the effort is worth at least a look.

When we add the possibility that one day certain kinds of programming might be contracted out by nations to the UK industry, the only software people able to handle the given levels of task-complexity, then I submit that a national institute for advanced computation is well more than a look.

It should be seriously discussed by any task force which Computer Weekly's initiative may bring into existence.

SEL updates operating system

A MAJOR update of Systems Engineering Laboratories' operating system for its SEL 32 microcomputer series has been announced in the UK. The system now includes a time sharing capability, and is accompanied by a Basic compiler and a database management system.

The time sharing capability, said UK managing director John Wright, would make the SEL 32 more attractive to the commercial market. Previously, the company had concentrated on scientific and technical users, though the system already has a Cobol compiler.

The Maximum database management system handles hierarchically organised databases, and has an added capability for managing partially inverted files. This allows the user to access records by the value of certain key fields.

The database software also supports a pointer item, allowing data to be referenced by absolute core memory location. This simplifies, in particular, the storage of data from real time monitoring and sampling hardware.

GEC system to produce Braille texts

A GEC 4070 is to be used to help produce Braille texts from English originals. The system, to be installed by the Royal National Institute for the Blind, at its new London printing works next year (CW, May 12) will drive a Braille line printer if a single copy of a document is wanted, or produce tape cassettes for controlling the embossing machines which produce metal plates used on printing presses for mass production.

English text will be input by 16 display terminals and edited online, so the system will be a considerable improvement on the present card based system which takes up to a year to produce a novel in Braille.

Racal show attracts over 6,000 visitors

THE annual Racalex exhibition of products from the whole Racal group attracted 3,500 visitors to the Royal Lancaster Hotel, London, last week, and proved the most successful yet, with 700 foreign visitors from 98 different countries attending.

In addition, 2,500 of the company's 6,000 UK employees visited the show.

Two products which attracted most attention were the Racal-Milgo System 180 Network Management System, and the Racal-Tacticom CAFF, computer-aided fault finding system.

condensing and re-writing long established scientific facts and useful arts.

OCTOBER 24: The Stanford Myoin system for clinical pathology.

OCTOBER 31: The Stanford Dendral system for organic chemistry.

NOVEMBER 7: A fast retrieval system for the Edinburgh Western General Hospital.

NOVEMBER 14: The state of play in computer chess.

NOVEMBER 21: Machine-aided synthesis of rules of thumb.

NOVEMBER 28: Proving chess strategies correct.

DECEMBER 5: Special aspects of machine intelligence.

Merrick elected CSA president

PETER MERRICK, managing director of the bureau Lowndes-Alx, was voted president of the Computing Services Association last week.

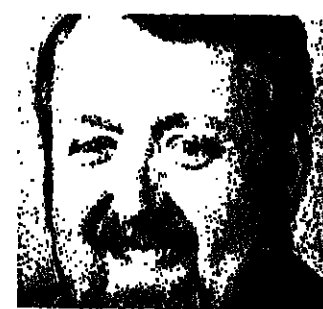
In his acceptance speech, Merrick said the growth of minicomputer and microprocessor systems meant that there was an even greater need for the professional expertise of service companies.

He also believed it essential that the CSA continued to recruit new members so that more

funds would be available to increase the effectiveness of its activities.

Merrick's vice-president is John Ockenden, of Scicon. The secretary is Basil Cousins, of Computel, and the treasurer Dr Douglas Eyselens, of BOC's bureau subsidiary Data Solve.

Barney Gibbins, of Computer Analysts and Programmers, has replaced Merrick as the CSA's representative at the European Computing Services Association.



Peter Merrick

This sporting life

OUR story about the system used by the Football League to compile fixture lists (Downtime, September 1) has evoked a response from a reader who has been involved with the system.

It appears that the system is also used by the Test and County Cricket Board. In fact the system can work out fixtures for any sport with up to four divisions and up to 40 teams in each division.

The system consists of a validation program, two sorts and a printing program. The validation program checks for inconsistencies, omissions and duplications, and has options for checking that each team plays every other team in its division once at home and once away, and for printing out lists of teams not playing on a given range of dates.

The printing program produces fixture lists by club or by date, according to the preceding sort.

The system takes five minutes to run on an ICL 1900 running under George 3, and 10 minutes to print the output.

Super-Zappers—the latest in computer crime

"COMPUTERS have provided crooks with a new way of stealing as opposed to the previous manual methods, and the timescale in some cases is milliseconds," according to Donn Parker, a senior consultant for Stanford Research Institute International.

"There is also a danger of organised crime and foreign powers moving into the computer crime field," he added.

This new world has been created by the introduction of computing into our personal and business lives, and it is a world inhabited by Super-Zappers, Trojan Horses and Salami techniques.

To many the jargon means nothing — just an "in" way to describe an event — but, says Parker, "I guess when a field has its own buzz-words, it has arrived."

Last week he chaired a two-day conference on information security, organised by Online at the Regent Centre Hotel, London.

He has lectured to FBI agents on the problems encountered by investigators in computer crime, and has been in the "computer abuse" field for about two decades.

An infamous example of computer-related crime is that of the Equity Funding insurance fraud, in which 54,000 fake insurance policies were produced and maintained by skilful manipulation of a computer. This resulted in an estimated \$2 billion fraud which was dramatised on television as "The Billion Dollar Bubble".

"One specific area important in terms of computer crime is EFTS, electronic funds transfer systems," said Parker. "The

opportunity for criminal acts here is enormous because the spotlight of responsibility is falling on fewer people. These people, in positions of responsibility will have more power, and so must be vetted much more carefully."

Supporting this view was Susan Nycum, a computer lawyer, based in San Francisco with the Computer Lawyers Association, who has worked with Donn Parker on computer crime.

"We have only seen the tip of the iceberg," she said, "and as more and more jobs become

automated, the danger increases. EFTS is a danger area."

Research by Parker on a selection of 362 computer crime cases has shown certain vulnerable areas. These include poor controls over manual I/O handling, failure of business ethics, poor control of computer programs, weak or absent physical access controls, and lack of operating system access controls and integrity.

"I can see no difference in the dangers between the US and UK," said Parker. "Programmers are one of the most dangerous types of people, and

the problem is that, with the state-of-the-art in computing, we cannot have any real safeguard. It will be at least eight years before a commercially available computer that has adequate safeguards is available."

"Super-Zapping is the method of by-passing system safeguards and procedures, and is similar to previous manual methods called 'Zapping'. Trojan Horse is a secret code embedded in the original program. Salami techniques involve apparently harmless acts such as rounding down of amounts, but due to the typical volume of data can be very lucrative.

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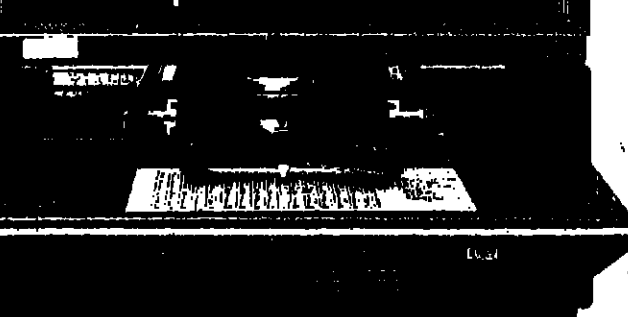
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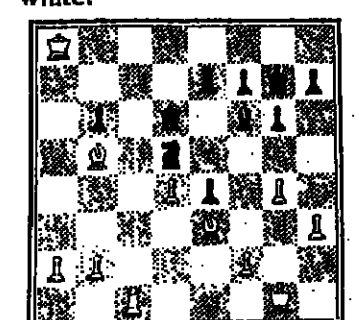
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CHESSLAB

by DONALD MICHIE

Machine strategies

LAST Chesslab (CW, September 22) ended with Russia's program Kaissa poised on the brink. If she had responded to Duchess's queen check by 34... K-N2, creating the position below, could mate have been forced by White?



The neat sacrificial sequence which Kaissa spotted (and side-stepped in the actual play by the last-ditch move 34... R-K1) goes: 35. Q-B8 ch! K x Q; 36. K-R6 ch. K-N1 (or B-N2); 37. R-B8 ch. Q-Q1; 38. R x Q ch. R-K1; 39. R x R mate.

Five moves make 10 ply. Kaissa, running on the IBM 370/188, as at Toronto, searches to depths varying from 7 up to 12 in quiet variations, more in forcing sequences. So it is not in this one, and the same

almost certainly goes for Duchess.

But since none of the chess-masters who were present spotted it, the "blunder" K-N2 might have offered best chances against a human expert!

The machine-versus-human contrast was heightened by a happening outside the official programme. International Master Hans Berliner was matched against a database containing an error-free end-game strategy for king and rook against king and queen. Its author, Ken Thompson of Bell Labs, was one of the two programmers of Belle, which ended the championship in fourth place.

Thompson has computed an exhaustive solution to the KQKR end-game and stored it on disc in the form of a look-up table of optimal continuations for all legal positions.

The complete space comprises approximately 2 million White-to-move positions and an equal number of Black-to-move positions.

Berliner was invited to play the queen's side against the database in consultation with International Master Lawrence Day.

The KQKR ending is tricky, but it is known to be a forced

win for the queen's side from general position. The assumption is that a strong master should be able to handle it. Yet Berliner found to his surprise that he could not win against the machine.

The machine conducted its defence in a style quite new to him, with manoeuvres which were counter-intuitive from the point of view of a human defender yet efficacious for maximally delaying defeat.

These manoeuvres frequently ran counter to the precepts of the chess books, which advise the rook's side, for example, not to allow separation of the rook from the king — a rule of thumb against White's bringing off a sequence of checks to build a skewer attack on the rook.

Hence the machine's play had the masters floundering in "unnatural" territory in which they repeatedly wandered from

the winning line.

The discrepancy between the defensive strategy implemented in Thompson's database and the strategy recommended in the books is easy to explain.

The database strategy has been generated under no other constraint than that it be objectively optimal, ie that it maximise the length of the forcing path leading to defeat.

The book strategy, on the other hand, has been prepared under the constraint of an added requirement, namely that it be feasible for a human to memorise, and also not require excessive calculation for its application in across-the-board play.

Could there be a machine methodology for generating strategies for humans? Later Chesslabs will return to this intriguing topic.

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OCTOBER / NOVEMBER

★ INTERNATIONAL EDITION —
SYSTEMS 77 PREVIEW
+ Bonus Circulation
October 13

The biggest West German showcase devoted exclusively to computer systems and peripherals, Systems 77 takes place in Munich from October 17-21.

Once again, Computer Weekly is taking a stand at the show to offer advertisers an unrivalled means of reaching the large number of high-calibre visitors to the show. During the course of the exhibition, 6,000 copies of the October 13 Computer Weekly edition including a comprehensive preview of the exhibits on offer, and a series of articles on computing in West Germany, will be distributed to visitors.

NOVEMBER 3
COMPEC PREVIEW
+ Bonus Preview

Following the resounding success of Compec at the Wembley Exhibition Centre last November, the show returns to the same venue next month with an even bigger line-up of companies eager to promote their wares. The show runs from November 8-11, and will be the subject of a supplement in Computer Weekly on November 3, where exhibitors will be given the opportunity to market their products to a large number of computer users and owners of the show will be distributed.

Topics to be covered include how microprocessors assist the peripheral manufacturer, how users are being used to change intelligent terminals into distributed processing systems, whether goes the mini-computer? threat from micro? are mini taking over from mainframes? marketing low cost commercial microprocessor systems: limitations of microprocessors; why U.S. exhibitors are more exciting than UK shows.

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The Liveware Saga

by Don

BELLA HAS BEEN SENT TO HOOK THE REGIONAL CENTRE AT CALLANISH INTO THE ARTHURNET SYSTEM BASED AT STONEHENGE... BUT THERE IS LANGUAGE...

WHAT DO YOU MEAN? WE'VE WINED AND FEASTED YOU FOR FIVE DAYS!!

DOES THAT EXPLAIN WHY I CAN'T READ YOUR CODING SHEETS?

SOB! ALL MY WORK IN RUINS!

RUNES! THAT'S IT.

WE'VE GONE ARTHURMERIC...

...FOR V-I-V-N READ (IN)CIPHER!

...INCOMPATIBILITY!

FOOL! INCOMPATIBILITY!

OUR ANSI NORSE CODE IS PERFECTLY ADEQUATE!

IT'S YOUR PROTOCOL, YOU KNOW!

I/O STONE

I/O STONE

...IS THIS EPT FOR BELLA? SEE NEXT WEEK!

PEOPLE

Seicon board seat for O'Malley

APPOINTED to the main board of Seicon Computer Services, a subsidiary of British Petroleum, is Jack O'Malley who has been responsible for marketing at the Seicon bureau since 1976. He joined the company in 1969 as an applications consultant in the turnkey systems division.

Rising through the hierarchy, O'Malley became operations manager and as such was involved in the planning of Seicon's computer installation, established at Milton Keynes. He was appointed general manager, sales, in 1975.

James Robson, formerly European sales manager of Rascal Zonal, has been appointed vice president of the European marketing division of the Wabash Tape Corp of Huntley, Illinois. He will be based in London.

O'Malley **Smith** **Murray** **Jackson**

Data General appointments

DATA General has made three new appointments. John Jackson as branch manager, Manchester, and Roger Smith as branch manager, Birmingham; both of them have been salesmen within the company; and Peter Murray as field service manager. He was previously a field operations support manager with Honeywell.

Mike Pybus has joined OCLI Europe of High Wycombe, Bucks, the marketing and sales division of Optical Coating Laboratories of Scotland and California, as a market development manager. He was previously a technical sales engineer with the Barden Corp (UK).

Robin Dyke has joined Uxbridge based Grandnet Information Processing as programming manager. He has previously been a senior consultant at Data Logic for the last seven years.

DIARY

- OCTOBER 11**
Computing the next twenty-five years. Dr Chris Evans, BCS Croydon branch, Fairfield Halls, Croydon, 19.15.
Speech recognition. Dr P. D. Green, BCS North Staffs branch, Royal Oak Hotel, Stafford, 20.00.
Databases: Coady and Non-Coady. Basil Cousins, managing director of Computal, BCS Reading branch, ICI, Levease Road, Bracknell, 20.00.
A historical view of input/output devices and storage. Dr D. J. Wheeler, BCS Nottingham branch, 71 main lecture theatre, Nottingham University, 19.00.
- OCTOBER 11-13**
Electronic instrument exhibition. Electronic Promotion Group/Industrial and Trade Fairs Ltd, Bloomsbury Centre Hotel, London.
- OCTOBER 11-28**
International Business Show. Business Equipment Trade Association. National Exhibition Centre, Birmingham.
- OCTOBER 12**
The work of the Central Computer Agency. Ray Atkinson, BCS Sussex branch, Old Ship Hotel, Brighton, 19.30.
Oracle - broadcasting the written word. David Wood, BCS Teesside branch, Teesside Polytechnic, Borough Road, Middlesbrough, 19.00.
- OCTOBER 12-13**
Meeting. IBM Computer Users' Association Telecommunications Group. Palace Court Hotel, Bournemouth.
- OCTOBER 13**
Why distributed computing? Dr F. E. Taylor, BCS specialist group, Prudential Assurance, Holborn Bars, London EC1, 19.30.
- OCTOBER 14**
The international conference on computer applications in the developing countries. Bangkok 1977. Dr D. J. Clarke and Dr N. Revell, BCS specialist group, Zeus-Hermes Consultants, 2-10 Copper St, London WC1, 18.00.
- OCTOBER 18**
Microprocessors. J. D. Klinker, JEETE, Lancaster Polytechnic, Rugby, 19.30.
How to recruit and keep staff.
- London EC1, 14.00.**
Database design and use. Tim Bourn, BCS Manchester branch, Manchester Business School, Booth St, Oxford Road, Manchester, 19.00.
Performance evaluation. Professor P. A. Samet, BCS Newcastle branch, Barras Bridge Building, Newcastle University, Haymarket, Newcastle upon Tyne, 19.00.
- OCTOBER 20**
Some reflections from a new recruit. D. Harding, BCS North Staffs branch, Post House Hotel, Newcastle-under-Lyme, 20.00.
- OCTOBER 19-21**
Conference on database management systems. Association of System 2000 Users for Technical Exchange (ASTUTE). San Francisco, USA.
Management conference, computer services exposition, annual meeting. Association of Data Processing Service Organisations Inc (ADAPSO), San Francisco, USA.
- Monro-Fraser. DPMA Sheffield Branch.**
Royal Hotel, Barnsley, 18.00 for 19.30.
Effective operations management. Jim Read, DPMA Bull Hotel, Gerrards Cross, 19.45.
Building on success: cornerstones of development from 380 to 3033. H. W. Tuftill, BCS Nottingham branch, 71 main lecture theatre, Nottingham University, 19.00.
- OCTOBER 19**
Implementing minicomputers. DPMA Central London branch. Control Data Institute, 77 Wells St, London W1, 18.00 for 19.30.
Railway signalling techniques. J. D. Baker, JEETE, Scarborough Lecture Theatre, Science Labs, South Road, Durham, 19.30.
Using DMS and data dictionary with Cobol. BCS specialist group, Polytechnic of Central London, 115 New Cavendish St, London W1, 14.15.
Human factors in the use of display terminals. Open discussion. Room 121A, City University, Northampton Square.

COURSES

SIX short non-residential courses are to be run by the NCC in the North-East during October and November. They are: database concepts, October 27-28; online concepts, October 27-28; Filetech, November 8-9; project planning and control, November 15-16; computer concepts for managers, November 17-18; and structured programming, November 26-30. Further details from M. Pass, tel: 061 228 0331.

TWO courses under the general heading Accounting for the Human Factor are being run by BIS Applied Systems. Their titles are Effective Presentation and Reporting Skills, and Interpersonal Skills-Transactional Analysis. The courses are residential and the first will take place on October 24-28 and the second on November 28-December 2. For further information contact Stephen Helms, 70-80 Blackfriars Road, London SE1 8BH, tel: 01-828 9511.

THE Department of Electrical Engineering at the University of Salford is holding two ten-session courses on microprocessors and minicomputers and their applications. The first covers fundamental aspects and runs on Mondays from October 10-December 12. The second course is a follow-up dealing with more advanced topics and applications and also runs on Mondays, from January 9 to March 13. Each session lasts one full day. Each course can be taken alone. Further details from The Academic Registrar, (Short Courses), Room 2, University of Salford, Salford M5 4WT, tel: 061-736 5843, ext 449.

SNA NETWORKS are covered by several courses which Hutchinson-Scoggins offers. Titles of some courses are Introduction to SNA, SNA Protocols and Logic Workshop, and SNA for Network Operations Controllers. For details of all courses phone 01-499 4501.

SOCCER

THE Summer Computer League champion is Jadou, which put the matter beyond doubt last week by beating SIA 6-0.

Latest results and league tables

Division I	
Jadou	P W D L F A Pts
Gryphon	8 0 0 4 11 16
L Transpot	8 5 1 2 29 41
Lloyds	8 4 1 3 18 9
FNS	8 3 0 3 18 10
Comshare	8 3 0 5 17 21
SIA	7 1 1 5 11 21
Southmark	8 1 1 6 10 23
Computing	8 1 0 7 7 9

Division II	
Denscene	P W D L F A Pts
Xerox	8 8 0 0 45 11
Reusers	8 8 0 1 31 17
Fiel	8 4 0 4 22 20
Comp. Weekly	8 3 1 4 18 17
Lambeth	7 3 0 4 21 22
Southgate	6 3 0 3 20 24
ISL	7 3 0 4 21 30
LSL Punter	8 0 0 8 0 0

Division III	
Altergo	P W D L F A Pts
ICL	8 8 0 0 52 13
Deceptive	8 7 0 1 35 11
3M	8 6 0 1 33 16
Airfix	8 4 1 3 27 17
Control Data	8 3 1 4 24 30
British Rail	8 2 1 5 18 29
BIS	8 2 0 6 13 43
KCS	8 0 0 8 7 8

OP SPOT

A forum for your ideas

HELLO THERE. My name is Bernard Allen and this week I am taking over Computer Weekly's operations coverage, particularly the weekly Op Spot column.

Let me tell you something about myself. I started with the Magnet Computer Bureau, a member of the GEC-Elliott group, where an Elliott 503 system was in operation. It was a small, lively environment, with two operators per shift, and I was soon introduced to the various aspects of computer operations.

Then I moved to Barclays Bank and became a member of a large shift concerned with the operation of two IBM 370/168s, running under OS MVT with HSP and supporting a large number of applications. At Barclays I attended a number of DP courses to broaden my technical knowledge.

My next installation was that of the London Electricity Board at the Elephant and Castle. I gained further practical experience by operating a 370/158 using OS/VS1.

That is the background that brings me to CW and Op Spot. Op Spot is concerned with computer operations - in all its aspects. This is a broad subject and each week I intend to bring a specific topic into focus. Some areas I intend to cover include:

Training: The amount and level of training available for operations staff varies greatly from one installation to another. In my experience operators, particularly trainees, often feel neglected in this matter.

Shift Work: All installations, regardless of size and the number of staff employed, work irregular hours to some degree. Shift systems are often the cause of serious comment in relation to such things as health and are sometimes the source of humorous tales - particularly the night shift.

Shift Allowance: Does the rate of allowance received by operations staff fully compensate for the inconvenience incurred by working unsociable hours?

Career Progression: In some firms operators are encouraged to move on to technical support or programming. Should operations expertise be regarded as an end in itself, or should it be treated as a prelude to other computing disciplines? In this respect I am interested in hearing from operators who have moved from operating and would like to know of any difficulties they might have encountered.

Communication. There is often a lack of communication between management and operators, and a lack of co-operation between operators and programmers. It might be interesting to consider these problems and how they might be resolved.

I would hope to broaden the format of Op Spot, using it as a forum where Computer Weekly readers can express their ideas and views. All communication is welcome, whether critical, humorous or topical. I look forward to hearing from you.

● If you would like to contribute to Op Spot, contact Bernard Allen, at Computer Weekly, Dorset House, Stamford St, London SE1 9LU.

Three bodies unite on privacy policy

FIRST of a series of joint statements on computers and privacy has been sent to the government's Data Protection Committee, which is drawing up proposals for possible legislation to protect personal data, by the British Computer Society, the Computing Services Association and the Data Processing Management Association.

The three bodies represent about 30,000 members of the computer industry.

The statement does not differ from views expressed in the three organisations' individual submissions to the Data Protection Committee last year. But, as Gerry Fisher, BCS retiring president, put it, "We felt that a joint statement by three major bodies representing people and companies in the computer industry would add weight to our separate submissions."

Alan Benjamin, director-general of the CSA, added, "It is important for the Data Protection Committee to find out if there are any areas the industry feels strongly about."

The first area considered by the three organisations is licensing. The statement, which formed the basis of Benjamin's presentation to the international conference on trans-border data flow, organised by the Organisation for Economic Co-operation and Development last month (CW, September 28), says the proposed Data Protection Authority should licence the use of information and also issue certificates of security to those responsible for operating the computers.

The statement says that work involving the use of personal data risks breach of privacy, so the public should expect that such work is done under controlled conditions. And it points out that the onus should not fall totally on the computer operations department because, although the department must provide security appropriate to the level of sensitivity of the data, in many cases it will not know what the data is used for.

The three organisations call for the formation of a statutory licensing authority which should be independent of government and supported by fees.

Fisher said a £10 fee for each application would cover costs, as estimates have put the number of applications at between 50,000 and 100,000, although it could be twice as many.

Other topics to be studied by the three bodies are the response time to a citizen's request for access to information about himself stored in computer systems; the role of reasonable access in drawing up security standards; the costs of security; and the harmonization of legislation in different countries.

One organisation absent from these joint discussions is the National Computing Centre. It was invited to join in, but, as Eric Howe, NCC deputy director, put it, "We didn't think it really appropriate for us to go in. It would have meant seeking our members' views again and we did that pretty thoroughly first time round so we decided to let our members' views stand."

EVERY IBM USER MUST KNOW ABOUT SNA

A MESSAGE TO MANAGEMENT

If you are involved in developing an IBM teleprocessing system you can't ignore SNA. You may already be committed to SNA without realising it.

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Date: 17th NOVEMBER 1977

Venue: MAYFAIR HOTEL LONDON W1

Cost: £65.00 + £5.20 VAT (including luncheon)

Phone Brian Burch for booking forms and further details

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Doubts on IBM sales boom

From Front Page

we will consider all the alternatives and the first thing we will look at is the 3033.

The bank is likely to be one of IBM's most important SNA customers.

Overseas Containers, running a 158 under DOS/VS and planning to switch to MVS, needs a second processor, but there is no question of switching the order for another 158 to one of the new IBM machines - or to an Amdahl or Ite system.

"The 158 has some time to run on the lease, and the second one, which we are getting in April, will be on rental," said DP manager Brian Barber.

"It will take about 18 months to get the system running in multiprocessor configuration, and we will start thinking about 3033 in two years."

"The Amdahl and Ite offerings are excellent boxes, and we wish IBM made them. If we had the leisure to check out all the possible problems ourselves, we would consider them, but we are heavily dependent on IBM software and support. IBM is anyway becoming more competitive, and we don't want the problems of multiple vendors."

At Dunlop in Birmingham, the 307/155 is about to be replaced by a 158, which will run under OS/VS1 where the 155 runs under MFT.

"We are not committed to the 158 and we do use plug-computers," said a spokesman. "Our approach is to start drives and then try a plug-compatible alternative. But as far as we feel that they are yet adequately proven."

At Esso, operations manager Nathan Higginbotham says that the company is always looking at alternatives.

"We have only had our 158, running MVS, for a year, so we are not ready to replace it. But Exxon does have an Amdahl 470 in the States, so we are not tied to IBM," he said.

Teunco is a subsidiary of a Norwegian bureau, and took over the lease on a 155 formerly used by the International Publishing Corp. IPCS. At present running MVT with modified HASP, the bureau has no immediate plans for a change.

The Stock Exchange is fully occupied getting Tullman up and running on its 158, and is likely to stick with IBM for at least another couple of years.

Thomson Holidays, running a big holiday booking system on a 158, believes the fact that it is using a special real-time system based on assembler-coded software from KLM precludes it switching to other hardware.

The London Electricity Board, running a 158 under OS/VS1, is quite satisfied with the system.

"We are determined to make the 158 a success and so is IBM," said a spokesman.

Freemans, the mail order organisation, is in the same situation, planning to continue with its 158 at least until 1980.

Sun Alliance, the big insurance company, has two 155s in Hordsham, and another in Birmingham.

"We are always looking at cost-effective alternatives, but cost is not always the overriding factor," said a spokesman. "We have looked at the new systems, and Ite looks interesting, but we are not keen to be first in the field with both hardware and software."

Datastream, the indispensable tool for the financial community, is running a very full 158 under MFT.

"We are looking to expand," said a spokesman, "but we have not yet decided whether to move to a larger machine or to put in a dual system, nor have we decided on a future operating system. We would want to see the Amdahl 470 prove itself before making a commitment."

ROSCOE the Librarian/online

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LETTERS

Why not join the DPMA instead?

FOR the Data Processing Management Association to reply to the letter of Mr D. K. Allan, secretary of the Kingston branch of the British Computer Society, would perhaps be presumptuous. After all, the letter was no doubt addressed to the BCS executives who, it is hoped, will make a considered reply in due course.

Meanwhile, Dave Allan asks what can individuals do about the impending imposition of the "immoral and unprofessional" application fee and higher subscription. The DPMA has a practical suggestion. Potential (and current) members of the BCS should consider joining the alternative computing association, the DPMA.

Unlike the BCS, whose membership has been "stagnating and is now declining, the DPMA is flourishing. Last month alone, application inquiries were equal

to 10% of present membership.

In no way is the association interested in the traditional internal bickering of the BCS. What the DPMA is involved in is reflecting and promoting the views of its members on a practical basis, such as a stimulating survey — in conjunction with Langton Information Systems — on the recent Carter report on the UK Post Office. The industry award scheme introduced last year is already regarded as the major DP management award.

Other current activities include the sponsoring of an industry standards publication for

first-time users, the mounting of practical seminars, workshops, conferences and branch meetings.

Incidentally, the DPMA's application fee has remained at £1 since inauguration, ten or so years ago. This sum amply covers all processing costs and the association has no intention of increasing the amount.

If you are a responsible manager, supervisor, practitioner or computer professional, the DPMA would like to hear from you.

NEVILLE TAYLOR,
Chairman, DPMA
Maidenhead, Berks.

The Editor welcomes letters commenting on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication.

Frankenstein moral: Be kind to the beast

I FEEL very sympathetic with the views of Robert T. Street (Letters, September 15) commenting on my article on machine translation. He speaks as a former translator, a practitioner of a very skilled craft, and he feels that no machine can replace him. What he fails to realise is that in this age machines must replace him, because human translators cannot possibly cope with the volume of translation required in the world today.

In the European Community alone the problem is so serious that a congress was held in Luxembourg in May with the theme, "Overcoming the language barrier." There are seven official languages in the Community and many documents are required in all of

them. Many are highly technical. There is such a shortage of translators that many have to translate documents dealing with branches of technology in which they have had no training. They have to rely heavily on computerised dictionaries and thesauri. Many of the documents presented for translation are ambiguous.

A number of translators spoke in the discussions at the congress and were in favour of machine translation. My own paper on Slant was well received and several translators congratulated me on it personally.

In the developing countries there is the very serious problem of the shortage of technical books in native languages. If these countries do not get books through machine translation they will not get them at all. There is also an urgent need for machine translation in other areas.

This is the situation, and whether Mr Street likes it or not, machine translation research will continue. Mr Street is doubtful, however, whether any such research can succeed. He stresses two points particularly: the difficulties in making and updating dictionaries and the difficulties in the actual translation process of dealing with nuances of meaning.

These difficulties undoubtedly exist, but he must be aware that some texts are vastly easier to translate than others. Personally I divide texts into two broad groups: "exact" texts and "non-exact" texts. "Exact" texts include business correspondence and texts in many branches of science and technology where every term must and can be defined exactly. "Non-exact" texts include texts in such sciences as psychology, where many nuances of meaning occur.

I am only concerned with "exact" texts at present, and in particular with business correspondence. The dictionary is small and changes rarely, and the sentence structure is simple. There are problems, but I feel confident that they will be solved. We can later move to more complex "exact" texts. Dictionaries are larger and need a good deal of updating. Many, however, are already in existence in the EEC in Brussels and have been specially designed and are particularly suitable for computer handling. I feel confident that the necessary techniques are understood for translating almost all "exact" texts.

It is when we come to the "non-exact" texts with their nuances of meaning that greater difficulties will be encountered.

These difficulties occur whatever method of translation is adopted. In my method the intermediate Number Language is very flexible and different numbers can be allocated to different nuances of meaning. For example, if you feel that there is a difference of meaning between "a hearty welcome" and "a cordial reception," you can give two expressions different numbers. In this type of translation, very much depends on the dictionary maker. He can make his dictionary as sensitive as he wishes. Much also depends on the programmer.

Whereas for "exact" texts style is usually of minor importance, for "non-exact" texts it is often desirable to make the output as pleasantly readable as possible. These are fascinating problems.

Mr Street has a very sensitive ear, has a knowledge of computers and is skilled in foreign languages. He is particularly well equipped to tackle these problems. We need help, Mr Street? Our address is BCS Natural Language Translation Specialist Group, Barrington Road, Bexleyheath, Kent DA7 4UW.

Mr Street suggests that I should transfer my energies to trying to promote better understanding between peoples. This in fact, is one of my objects: researching machine translation. I want everyone to wish, to have a computer friend correspondence in someone in any other country without having to learn a foreign language. I also want children in the world to be able to read any of the world's books that they want to read in their own language.

I am a lover of reading, as Mr Street evidently is. I too have read "Frankenstein," but I do not see the monster as Mr Street does. I sympathise with the unfortunate monster. When he was first created he was gentle, friendly, studious, highly intelligent and anxious to be loved. But because of his unusual appearance, he was ruthlessly hunted like a wild animal by the local people and finally became brutalised.

In Mr Street's letter, Frankenstein's monster is the computer. This being so, the moral is to be kind to your computer. Start by feeding it with easy sentences for translation. Bring it along gradually, until in the end it responds to your lightest word with your most delicate nuances of meaning. Perhaps in time you may even learn to love computers as I do.

WALTER GOSWAMI
Bexleyheath, Kent

Expensive truisms

"CORRECTNESS is the main foundation on which reliable software can be built" (User View, September 15).

This profound thought, which costs £85, will amaze DP practitioners the world over. No doubt Intofech International Ltd will be inundated with orders for this revolutionary document.

Another astute comment in the report, according to User View, is that the most important factor in software is that it should perform the tasks required of it. Is there no end to the brilliance and originality of the State of the Art series? Now that Intofech has revealed the truth about software, there is

going to be a major reorganisation of the whole foundation of computer technology.

A 2,000 page report is available from: Eurtech Publications which makes a valuable contribution to the putting practice of a system of maintaining that central part of the computer world. The report explains how to write a program and how to write a program in a modern language. The report is a must for every computer programmer.

GIM's single bit

A SINGLE-BIT microprocessor for applications requiring an inexpensive sequence timer and controller has been introduced by General Instrument Microelectronics. Called a Sequential Boolean Analyser (SBA), the device is programmable in Boolean functions to facilitate the direct replacement of electro-mechanical circuitry in industrial applications.

Housed in a 40-pin package, the SBA comprises a logic unit, an associated 16-level stack to facilitate the execution of multi-term functions, a 1024 by 8 bit word ROM program memory and a 120 bit RAM which is used to store as many logic states. Thirty of the 40 pins are available as latched input/output, and can be mask programmed exclusively for either function. If the interface requirement is greater than this, inputs and outputs can be multiplexed together on common pins.

A range of hardware and software development aids have also been produced for the device, including an evaluation chip where the ROM has been replaced by an external PROM for program development work.

Oxford seminars

MICROPROCESSORS, already quietly carving a niche for themselves among computer users, have been brought even more into the arena of public debate by Professor E. W. Dijkstra's attack, and Iann Barron's defence of the rise of the micro (CW, August 18).

So a series of seminars, devoted to technical and applications aspects of microprocessors, at Oxford University, is particularly timely. The first meeting is scheduled for October 13 at 4.30 pm, and will feature a review of developments in microprocessor technology, by Howard Kornstein, of Intel.

Further meetings, held once a week, on Thursdays, will deal with a variety of hardware and systems software topics, and applications ranging from process control to image processing. Speakers will include Tony Duncan, of Oxford; Professor H. G. Bristow, of Bristol University, and representatives of CAP Microsoft and University College London's Clip array processor team (CW, February 24).

Venue for the seminars is the nuclear physics laboratory, Keble Road, Oxford. Admission is free.

Gothenburg fair

ABOUT 100 manufacturers and service companies in the microcomputer field are expected to exhibit at the Mikrodator 77 trade fair and conference in Gothenburg from November 15 to 19.

A different conference theme will be taken each day, covering microcomputer technology and the community, programming, microcomputer architecture, and maintenance and quality control.

Further information on the fair-day fair can be obtained from the Swedish Trade Fair Foundation, PO Box 1223, S-402 21 Gothenburg, Sweden.

'The ill-equipped decision-makers'

THE micro in its many guises has already achieved such explosive growth that decisions on its implementation in systems are being taken by managers and engineers ill-equipped by experience.

This, according to Richard Peattie, engineering director of the Electrical Research Association, has already been confirmed by early work carried out for the recently announced project, "The Engineering of Microprocessor Systems".

"While improving technology is making microprocessors easier to use," Peattie said, "there are now more people with less skills involved in system design and implementation, so that even better tools are required."

He pointed out that as microprocessors are introducing new technology and problems into many non-electronic organisations, software had now

become the dominant factor.

The project involves the association in a detailed investigation into microprocessor system economics, hardware development aids and support software to be carried out in five interlinked phases. A principal objective will be to help systems engineers appreciate the technical, financial and managerial aspects of developing a microprocessor-based system.

The early work on the project has highlighted several trends in the industry that are not altogether beneficial.

For example, although support facilities for microprocessors are improving steadily, and the devices are achieving some comparison with minicomputers, the single chip microcomputer has, temporarily, reversed this trend. The physical constraints of the device currently make them harder to program

and less general in application.

Again, although there is now a wide range of development hardware available, there has been little corresponding activity in software. High level languages are becoming available, but they put a higher demand on the development system, especially in terms of memory.

In addition, the project has shown that much of the high level software now available contains bugs that can play havoc with a new product development schedule.

These initial views on the microprocessor have stemmed primarily from the 40 companies which have already agreed to participate in the project. The majority are end-user companies, many of which already have practical experience of implementing micro-based systems.



Chris Nabavi, head of ERA's Microprocessor Development Group, surveys some of the wide range of equipment available from which systems engineers must choose.

8-bit octal register

FIRST in a range of 20-pin octal interface devices designed to drive the high capacitance and low impedance required by long buses.

Future devices will include Schottky and low power Monolithic Memories, the first device is an 8-bit octal register.

type SN74S374. It features 8-state outputs designed to drive the high capacitance and low impedance required by long buses.

Future devices will include Schottky and low power Monolithic Memories, the first device is an 8-bit octal register.

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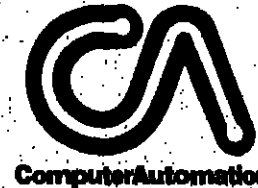
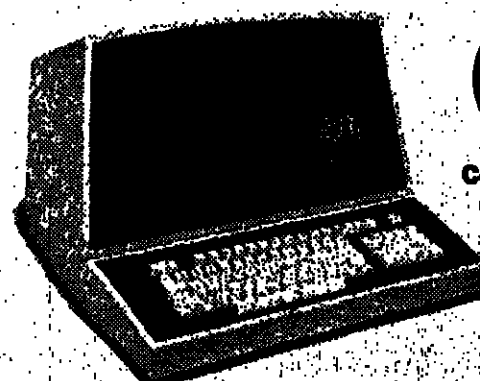
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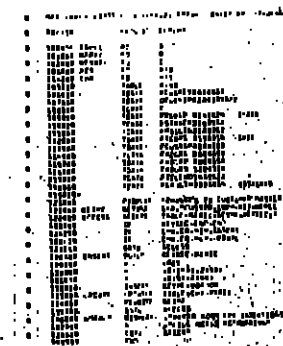
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...the British Computer Society.
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Bridging the gap in the BCS

Paul Samet
... "It is wrong to split the computer profession into academic and commercial divisions."

THE academic versus the commercial: that perennial BCS discussion will once again raise its head this year, as Professor Paul Samet takes over the presidency.

On the face of it, there could be no bigger contrast between Gerry Fisher, the retiring BCS president, and Professor Samet. Fisher, as head of management services for Associated British Foods, is deeply immersed in the commercial world, and his voice is always being heard at meetings and conferences asking the question, "But what

does it mean to the typical commercial DP installation?" Professor Samet, on the other hand, has lived most of his working life in an academic environment, from his initial training as a mathematician to his current position as professor of computer science at University College London and director of its computer services.

This contrast is, however, a superficial one. In their current jobs, as heads of large computer service departments, both men are faced with similar types of day-to-day computer management

problems, although in different environments.

And far from representing a schism in the BCS, it is a sign of health that the BCS can attract leading figures from different walks of DP life.

In fact, Professor Samet hopes to show during his year that there is no dichotomy of interest between the so-called academic and commercial worlds.

"For a start, it is wrong to split the computer profession into academic and commercial divisions," he comments.

"If a distinction is to be made, it is between those involved with computing techniques and those involved with applying those techniques."

It was at this stage he realised that the most important thing to help others to use the machine more easily.

"Deuce was a beastly program in an assembler; it did not even allow the user to name. In order to make it work properly, every bit had to become a personal friend," he recalls.

Although he found the BCS work interesting, at this stage still had no intention of making computers his career.

But, at the end of 1955, allocations had been made to the establishment of a number of computer centres, including at Newcastle, which was part of Durham University.

After considering taking another post in mathematics, he eventually plumped for the job as a lecturer in computing at Newcastle. It was now under the spell of a computer, and in 1961 he became director of the Southampton computer laboratory. Six years later he moved to University College London to set up the computer centre and became Professor of Computer Science in 1970.

"You know, it's funny," he says, "even just before I took the professorship, my mother was still asking me when I was going to get out of computing into a 'real academic career as a pure mathematician'."

Mrs Samet should not worry for her son has made it clear that of his own choosing he has entered his presidential year of the BCS.

For she is not the only person to question whether computing is a profession in the same way as the same status as an established profession, a doctor, lawyer, architect or accountant.

Although the BCS is now an established part of the computer community, it has only just begun to establish itself as a profession.

If Professor Samet goes any way to bridging the gap between the "academic" and "commercial" applications, he may not be a computer professional, but he will be a professional in the way of the BCS as a body which is the way of the computer profession.

Mathematics was his first love, and his first encounter with computers in 1951 did not

"I would like to show that each side can gain from the other new perspectives, new dimensions to their own work."

The computing technician, in Professor Samet's view, is primarily concerned with an understanding of "systems" as opposed to particular applications, and with an awareness of the theoretical concepts that underpin the application.

This sense of the general rather than the specific; of the similarities rather than the differences underlying computer applications; of the long term systems requirements rather than the short term expediencies of daily DP life; these are the qualities that Professor Samet believes the technician can offer the DP applications person.

Most importantly, the technician should develop the technology that will enable applications problems to be solved more simply and effectively.

On the other hand, the applications person can give the technician a "sense of scale and of real life experience" and pose a range of interesting and practical problems to be solved. With this awareness that a reasonable solution today is often preferable to a perfect solution next year; that a general approach is only meaningful if it can be translated into a workable specific solution.

Professor Samet himself is in a good position to see the mutually beneficial nature of a bringing together of the two sides of the DP community, as he is responsible for running a large computer service as well as having a firm grounding in computing techniques.

During our interview, he suddenly leapt to the blackboard to explain how a mathematical understanding of the nature of multiplication could improve the speed of processors.

His enthusiasm was not just for the mathematical theory, but the fact that the result could be put to practical use in processor design. "And just think of the commercial impact if we could make a significant advance in understanding how to sort n items more quickly," he added, with a glint in his eye.

Like many other prominent figures in today's computer world, Professor Samet never started out wanting to become a computer professional.

Mathematics was his first love, and his first encounter with computers in 1951 did not

entice him.

While studying maths at Cambridge, he went along with a friend to a lecture by Professor Maurice Wilkes, whose pioneering work on EDSAC at Cambridge was well under way. "I did not understand a word Wilkes said," Professor Samet now admits.

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THE AUTOMATED OFFICE / IBS PREVIEW

Changes in the office are occurring at an increasing frequency, giving rise to new concepts such as word processing, and the "automated office".

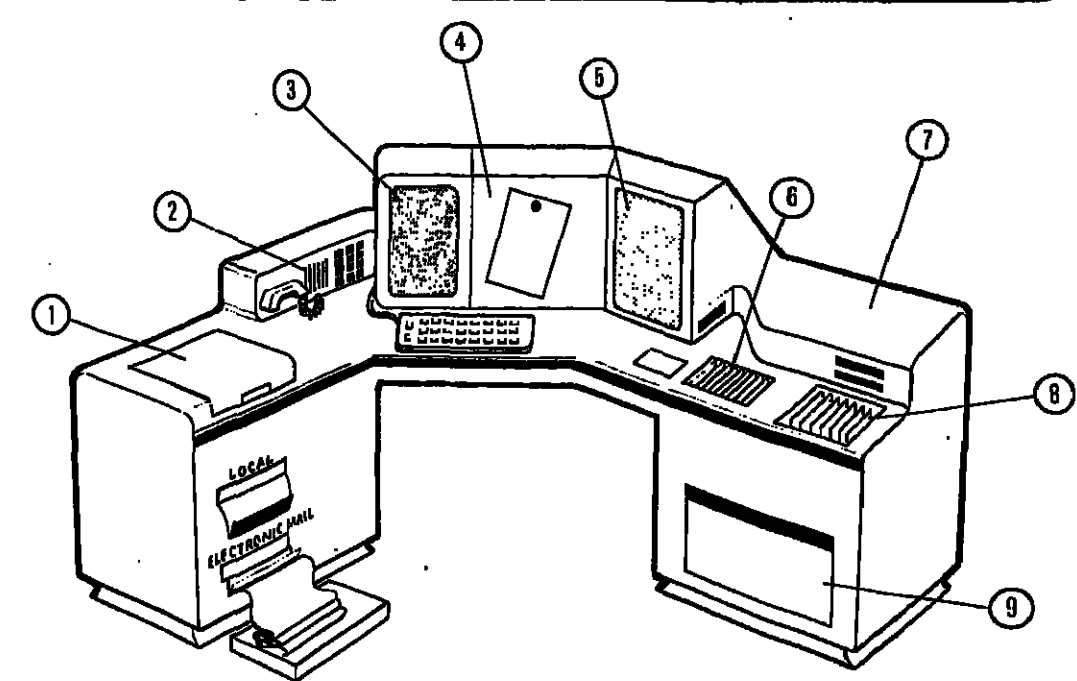
Forerunners of these and other eventual systems can be seen at the 1977 International Business Show to be held at the National Exhibition Centre, Birmingham, from October 11 to 20, and a preview is given in this supplement.

But despite the progress, doubts whether such systems will become an integral part of the office, or even whether they should be

allowed to, are still harboured by some.

The opening article, by Tom Stewart and Leela Damodaran, discusses the merits and disadvantages of the office of the future, and the impact it will have on those who work there. A possible design of the future workstation, an integral unit through which communications and work will be channelled, is also given.

One forerunner, in terms of electronic mail, could be the Comsys currently used worldwide by its designers, Hewlett-Packard. John Conry, a systems analyst with the company, discusses this system.



The automated office workstation for the information assistant - unlikely ever to be built as one unit, but the components are available, or will be soon. Key: 1-Flat-bed document input systems for copying (both local and remote) and scanning to input to computer system. 2-Loud speaking telephone with programming functions. 3-Nearly vertical A4 VDU screen for access to information system, word processing system and central records. 4-Magnetic board for holding source documents. 5-Microfiche reader, also accessible to computer control. 6-Microfiche store. 7-Two floppy disc drives linked to local microprocessor and also to central large computer network. 8-Floppy disc store. 9-Personal belongings locker.

● Turn to Page 18

'Motorways' to the office of the future

By Tom Stewart and Leela Damodaran

THE office is essentially an information processing system in which decisions are made and information is transmitted, stored and retrieved.

The office of the automated office is an improved throughput of information and decisions comparable to the sizeable increases automation has brought to production. However, at present, office automation has been patchy and fragmented, rather like a poorly planned road system. In some areas the information flows along six-lane motorways whereas in other areas it crawls along dirt tracks.

One current "motorway" involves photocopying. It is easy to generate hundreds of crisp, clear photocopies (if the machine is properly adjusted) and distribute these to all manner of people. Receiving or making a photocopy of a document or report has become a substitute for reading it. In fact, it is the sheer volume of information which photocopying has exploded into the office.

Tom Stewart, a lecturer in Ergonomics at Loughborough University, has been involved in a number of research and consultancy projects in the man-computer area ranging from computer system evaluation and dialogue design to hardware evaluation and terminal design.

Leela Damodaran is a research fellow in the Department of Human Sciences at Loughborough. She has, since 1970, been involved in teaching and a number of research and consultancy projects at the university. Her principal research interests have included studies of man-computer interaction and its implications for work design.

Another "motorway" is the automatic production of standard forms, letters, invoices and bills which computer technology allows us to churn out in their thousands. However, someone somewhere has to read the letter or form and make a decision accordingly. Indeed many people are fully employed sorting out the queries and problems resulting from mistakes and errors which creep into such systems.

These "motorways" unfortunately feed into "dirt tracks." Although computer databases, providing complex retrieval and access facilities, may be commonplace, a large part of the

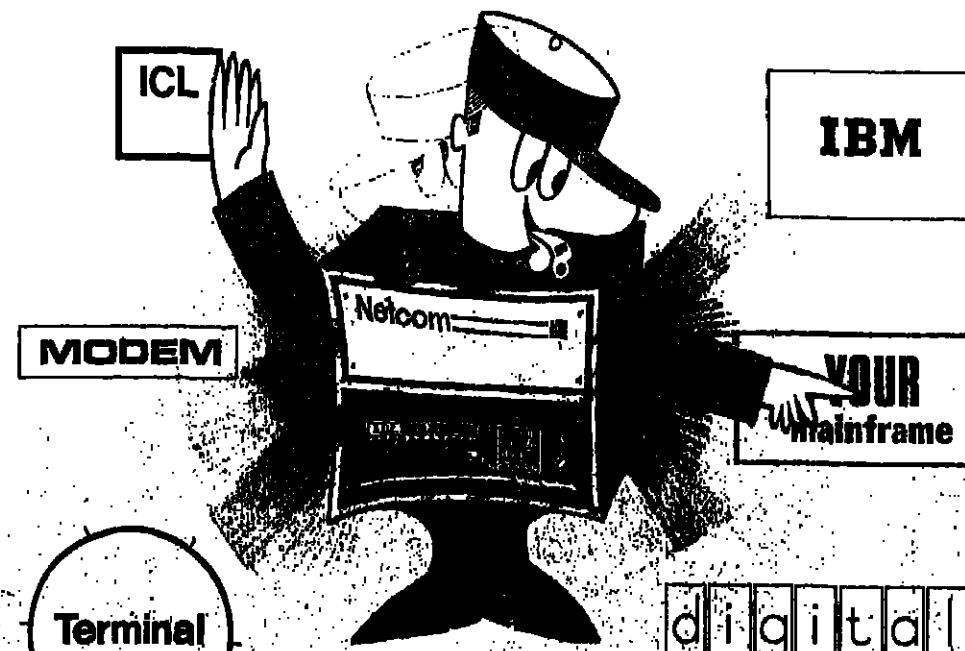
traditional office function involves the storage and retrieval of documents and other originals which may be more than simply their apparent information content. These pose quite different problems in order to store and retrieve them accurately and efficiently.

There are systems to automate filing cabinets using drawers which run on electric motors or, alternatively, an entire stock of physical documents may be microfilmed and stored on fiche or reels. However, neither of these is entirely successful nor do they replace the traditional filing cabinet which occupies every office we know. One "dirt track" at present concerns the creation of documents. The creative process of writing a letter or report, in our case at least, involves scribbling barely intelligible marks on a piece of paper which are then typed up and corrected and despatched in a readable form. It is possible to use a dictating machine but this is an unusual skill which not everybody has, and subsequent transcription is very labour intensive.

Another "dirt track" involves making telephone calls. The introduction of STD both within the UK, and in Europe should have significantly speeded up the process. However, it still remains possible to take a long time actually to get into contact with the person you want. The local exchange may be busy or you may have to go through a number of secretaries to get to the right person. All in all, many phone calls turn out to be a lot of work rather than a simple, straightforward communication exercise. This either involves the secretary in a lot of work producing the numbers for the boss or if you are dialling yourself it can be a very lengthy and frustrating procedure especially with long telephone numbers.

Two "motorways" at present, therefore, are the production of standard forms and photocopying and three "dirt tracks" are the creation of text, the storage

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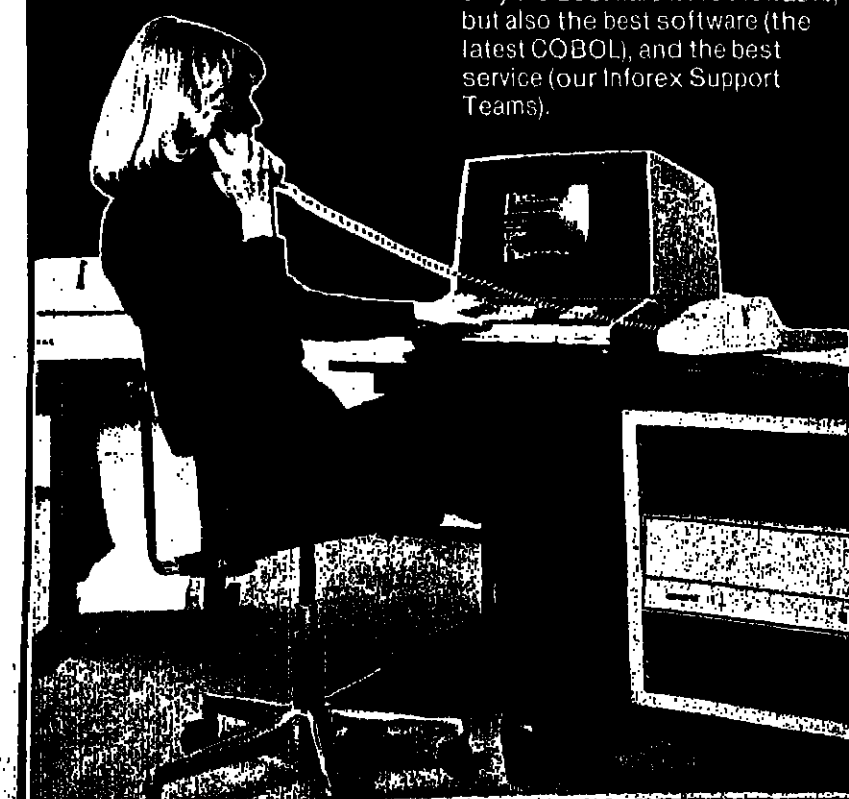
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THE AUTOMATED OFFICE/IBS PREVIEW

Robin Webster presents a preview of the 1977 International Business Show, which opens next week at the National Exhibition Centre in Birmingham.

The centre for 'wise business buying'

A WIDE variety of new office equipment will greet visitors to the 1977 International Business Show — formerly the Business Efficiency Exhibition — to be held at the National Exhibition Centre, Birmingham, from October 11 to 20.

Its theme will be "the centre for wise business buying". The Duke of Kent, who is to open the show, will arrive by helicopter to tour the exhibition

centre, and the organisers BETA, the Business Equipment Trade Association, are expecting over 100,000 visitors during the 10 days.

Some companies such as ICL, last seen nine years ago are making an appearance again after a long absence from the previous BEE exhibitions.

The emphasis of product ranges is of the "automated office" concept, with desk-top

business systems and specialised furniture. Word processing equipment is also prominent.

Running concurrently with the exhibition will be a range of seminars organised by the British Institute of Management looking at "the office as the administrative nerve centre of a business".

This will consist of a programme of 24 seminars, covering three major topics: computer

techniques, office systems, and administrative management. Specific seminar topics will include distributed data processing, staff selection, training and development, management information, word processing equipment, and productivity in the office.

The seminars will take place in the Metropole Hotel, adjacent to the exhibition centre.

Univac will provide a specially

designed computerised information system for visitors. It will use U200 terminals sited at seven main information stands and provide answers to inquiries relating to more than 500 production categories on show. Hard copy print-out will be available.

Univac will also display its UTS 400 and UTS 700 intelligent terminals.

As the IBS is a focal point for the office equipment/business world, it is hardly surprising that some interesting new products are being launched there, including the Honeywell Page Printing System. This will compete with the IBM 3840, but is offline, uses different print technology and delivers and collates individual sheets of paper.

Using an electrostatic printing technique, the PPS operates under microprocessor control, reading seven or nine-track print image magnetic tape, and converting data from these to printable symbols. Copy can be generated at the rates of 90, 140 or 210 pages per minute; equivalent to about 8,000, 12,000 and 18,000 lpm respectively.

It is aimed at all mainframe users, such as those with ICL, IBM and Burroughs equipment.

Hewlett-Packard will be launching a new desk-top computer system, the Series 9800 System 45. This features a 12-inch display, use of the new ANSI Basic, applications software and an optional graphics package with high-speed hard copy output.

ICL has designed "Computer City", a new walk-around exhibition complete with precincts, a news kiosk and a theatre.

ICL's whole range of computer systems for small businesses and distributed processing applications will be featured, with the emphasis on the use of video terminals and direct data entry devices by unskilled staff.

Main items of the display will therefore be the 7500 Series of communication devices, and the 1500 Series of transaction systems. They will be driven by a 2803 Series and a System Ten 220 Series computer.

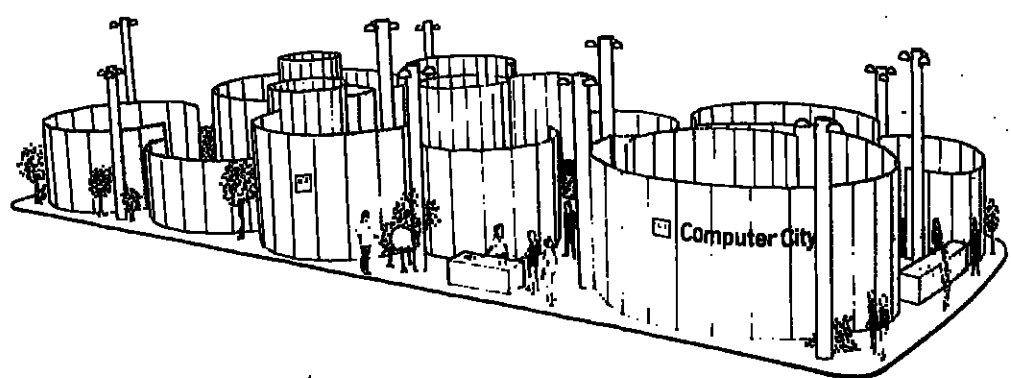
On the NCR stand will be a wide range of computer, point-of-sale and microfiche processing equipment. Among these will be the NCR 850 minicomputer to be shown with a line and matrix printer, a television repeater screen, and four VDUs.

From its PoS range, there will be the NCR 255, online to an NCR 728 minicomputer with a laser slot-scanner checkout and the NCR 250/7600 for the first time with an OCR/A wand for product code reading. Complementing these will be the NCR 2060 and NCR 2135 electronic sales registers for the restaurant and supermarket fields respectively.

Word processing is now employed by many offices for the preparation of original documents, and one of the companies supporting the trend is IBM.

The IBM Word Processor 32 is

One of the attractions at the IBS will be ICL's Computer City, a walk-around exhibition, which will feature precincts, a news kiosk and a theatre.



IBS a launch pad for new products

From Page 16

processing control system, will be launched by Lanier. Micro-based, it monitors, analyses and controls throughput of word processing centres.

A new range of word processing equipment will be available from Computer Data and Machines. The range, entitled Contessa, comprises three basic models. First is the Contessa 5000, an 8K micro-based system with three mini diskettes or dual density floppy discs, a 55 cps daisy wheel printer and an independent keyboard.

The 6000 has a single line display for text entry and correction, but is otherwise the same as the 5000. Top of the range is the 7000, which offers a complete VDU and up to 64K main memory on mini diskettes.

The 6000 has a single line display for text entry and correction, but is otherwise the same as the 5000. Top of the range is the 7000, which offers a complete VDU and up to 64K main memory on mini diskettes.

Unlimited range

TWO significant enhancements to the computer output microfilm systems will be introduced by Bell and Howell at IBS. These are a stroke generator claimed to provide an unlimited range of character sets and a 6250 bpi tape drive.

Bell and Howell says that the stroke generator can produce upper and lower case characters in three sizes, and that these can be standard, italic or bold. It can be retrofitted to existing Bell and Howell 3700 systems.

The 6250 bpi tape drive runs at 75 ips and permits data to be input to the COM system's microcomputer controller at approximately four times the rate previously available, according to Bell and Howell.

of 1800K with dual density floppy discs.

Another word processing company, BDP (Word Processing), will feature its BDP 90 model with mini discs. The system incorporates a daisy wheel printer with integral keyboard, linked to dual mini discs.

Three versions of the D2100 word processor from Dataplex will be exhibited, each incorporating 128 character, buffered keyboards, enabling quick correction of errors. Also, there will be the programmable Dataplex D2000 with visual displays for easy reformatting of text.

Office computer systems are on show, too. Daro Office Equipment (UK), will offer a choice of systems, from the electromechanical model 1350 to the model 1720 office computer system. The 1720 is designed to handle primarily invoices, stock and sales ledger accounts, and general accounting.

A magnetic stripe card option is also offered. Midland Business Machines will be showing its new Financial Management Systems Pack, the first time. These management information systems can be tailored to the individual user.

Kienzle Computers is using the IBS as a launch for its computer. Its calculator range begins with the Racer 8 liquid crystal display model through to the Multi 8 which has dual displays one above the other. Making its UK debut from

for this, and for Kienzle 2000 and 6600 models.

Altego Computers will launch a micro-based system that will run word processing software. And the recently released Avenger systems will be there, showing applications such as sales order processing, sales ledger and payrolls.

From the recently revived Compucorp, which at one time disappeared from the calculator/computer market, will come a new desk-top computer, the Compucorp 625. This has up to 64K storage, a mini floppy disc, a 40-column printer, a VDU screen and will use Basic and Assembler.

In its calculator range, will be the Compucorp 326 and 327, which both feature cassette storage.

A new office computer system is to be introduced by Datasab, showing the D12 MLC, which uses magnetic stripe cards for order entry and alpha-matching applications.

Texas Instruments will have its full range of calculators on show, from the TI 1000 at the bottom of the scale up to the TI 59 which is a hand-held programmable model.

Independent business computer manufacturer, CTL, will have a "hands on" presentation and demonstration at its stand. Visitors will be able to use terminals to run jobs on a CTL Model 8050 computer with 9.6 Mbyte storage, a line and serial printer. CTL's business systems are based on its Series 8000 line of products.

Offered by Computer Anellaries will be a low-cost data entry unit and a desk-top microcomputer.

Launched this summer, the MAEL 1841 data entry device uses either cassette or diskettes, and can be user programmed. It incorporates a 4K micro, a VDU and a single diskette facility. The MAEL 2841 microcomputer is the first desk-top model in the range and incorporates 8K memory, a VDU, keyboard, twin floppy disc drives and a high-speed printer.

Tektronix is showing three computer graphics products; the 4006 low-cost terminal, the 4015-1 large screen terminal and the 4051 graphic computing system.

The exhibit is designed to demonstrate the versatility of these systems in general business applications.

Data capture will be highlighted by Data Recognition, which is showing the Datatag 4 and System 83.

Datatag 4 reads computer and hand-written bar marks on price tags to allow the tracking of stock movements.

The full range of Telexers from Sagittorn Electronics is being featured. These produce telex ready paper-tape from a standard IBM golf-ball, typewriter, an IBM MCII word processor or the IBM 82 memory typewriter.

Dymo Business Systems will be the TLR (Transaction Log Reader), a high capacity sales recorder produced after a joint research programme with a US oil company. The TLR allows substantial reductions in paperwork.

Data Maintenance, the on-site disc cleaning company, will have a full range of equipment and services on its stand, including the recently released DML 656 Disc Pack Inspector, as well as cassette and floppy disc cleaning equipment.

Optical character, mark and wand recognition systems are to be displayed by Kenrick and Jefferson's Business Forms Division. Emphasis will be on photo processing order systems, regular payment systems, and shop floor data capture.

A number of new floppy discs, including a minidisc, and new disc cartridges for IBM-type 2315 and 5440 systems, are among the products to be exhibited by Willis Computer Supplies.



Gracing the Altego Computers' stand at IBS will be the woman racing driver Davina Galie.

Any person seated at this desk can do the work of three people.

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THE AUTOMATED OFFICE/IBS PREVIEW

EVER since the day nine years ago when Hewlett-Packard decided to develop an internal high-speed data communications system which uses ordinary voice-grade telephone lines, there has been a large degree of interest in the system shown by other users and potential users of data communications systems. The reasons for this are probably because the way a computer manufacturer tackles its own data communications tasks is bound to be intrinsically interesting, and because right from the early days the system has been manifestly successful — particularly in saving costs. The end result of this interest came earlier this year with the launching of the commercial equivalent of the system — the HP-2026.

Architecturally, Comsys is fairly simple and straightforward. It is based on the company's established HP 21-MX E Series computer, the HP 2645A microprocessor-based VDU and a new operating system which is a modified version of the HP-2000 series' DOS III system. Each unit can be equipped with tape drive and line printer. There are altogether 84 Comsys locations worldwide within HP.

Despite its simplicity, Comsys is much more than a dedicated data communications system. It transmits internal "telex" type messages called "comgrams" between office locations in company parlance. It offers the facility of distributing lengthy management reports nationally or internationally at high speed and is used for the handling of inter-office business such as orders, invoices, statements and credit notes. The differing requirements for repairs, parts

and complete systems are taken into account on each document. Apart from these uses, the system hardware can be used for routine data processing functions in between transmissions.

When a user wishes to use the Comsys system to handle an outgoing message or document, he keys in a job name pertaining to a particular document to start and is then taken through a series of requests on simple recognisable screens appearing on his terminal; each of these screens must be filled before the data can be filled for transmission, thereby reducing the possibility of incorrect or incomplete messages. The question and answer format compares very favourably with standard Post Office transmissions where no such controls are exercised.

Hewlett-Packard have developed their own series of screens to cope with particular office routines, but a special sub-system allows the user to design his own screens to suit his particular requirements. The sub-system is called Data Entry Application Language, DEAL, and allows non-programmers to make full use of the relevant

By John Conry

The Hewlett-Packard data communications system HP-2026, is a commercial equivalent of Hewlett-Packard's own in-house system, known as Comsys. Here John Conry, systems analyst/programmer at Hewlett-Packard, discusses the development of Comsys over the years and indicates how the system and its commercial equivalent might evolve.

Assembler routines.

Incoming messages are first stored on tape and are then processed according to job type. In Hewlett-Packard's Wimmerh Offices, most incoming comgrams are printed on a high-speed printer and distributed by hand internally. However, the Wimmerh office also acts as a receiving and transmission station for comgram messages from other UK offices not yet equipped with full Comsys facilities.

Once identified as such by the operators, these can be linked directly to the telex system via five-level paper tape without the staff having to re-key the message. Comsys also features auto-answer — an Ansafone-

type message-receiving facility which will accept incoming data automatically, even when the computer room is unmanned. The other important area of use is the distribution of management information. A mainframe computer in Geneva prepares a number of spooled reports and these are sent by Comsys to various international offices. As the amount of local data processing increases with the availability of HP-3000s, comparative in raw processing power to an IBM 370/145, this type of use for Comsys is likely to drop off on an international level, but the system certainly gives the company flexibility in dealing with the processing of management information. It is

also likely to continue to be used for dissemination of reports on a local level.

Apart from these regular functions, Comsys also gives the company the ability to transmit one-off pieces of information. A notable example of this was when a user within the company had been trying for some time to obtain a copy of a particular program not available locally, but he was able to obtain a copy of the program from the US via Comsys in less than half an hour; transmission itself took just 45 seconds.

In the UK there are at present just two Comsys receiving stations; at Wimmerh and at South Queensferry. Most UK data is routed through Wimmerh, and all outgoing traffic goes to the HP European message-switching centre in Geneva. Every day there are at least two complete "cycles" comprising one outgoing session and one incoming session, morning and afternoon. On a typical day, the UK Comsys might receive 350 messages from other parts of the world, with approximately the same number of outgoing ones. It is relevant here to mention

cost savings. In six years, the volume of data handled by Comsys Central in Palo Alto, increased by a factor of 80, to 15 million characters per day. At the same time the cost of internal toll charges made by HP's corporate department has increased only by a factor of five. In fact, since 1973, the charges have actually crept down by 60 per cent and there is to the user department of transmitting a 500-character message, about 80 words, is now a paltry seven cents in the US.

The improvement of modems and the increasing use of very high transmission speeds has undoubtedly been the main factor in these improvements. The Comsys system terminals are at the moment transmitting at 2400 and 3600 baud and this could increase to 4800 if there is a successful outcome of discussions now going on between the company and various telecommunications authorities.

In the meantime, there are some other interesting possibilities on the horizon for Comsys. One is to exploit Hewlett-Packard's versatile HP 2645A display terminal a step further, and use it as an off-

ending and receiving station for Comsys. In a way the UK is an ideal proving ground for development, as there are a number of branch offices large enough to justify installing full Comsys facilities, but needing to be linked to the

HP-2845A is a card-based terminal which features "soft" or near-programmable key facilities which could be used for storing screen formats. This terminal could record today's branch messages and transfer this over voice-grade lines to a Comsys station at either Wimmerh or at Altrincham, the company's Northern office, which will be getting a complete Comsys station in the near future. Another development over the coming months is the availability of the HP-3020 50 Mbyte disc as an optional extra.

Recent developments in the realms of the mini and micro computer are bringing us nearer to the reality of an automated office. In fact, Comsys can be configured in such a way that certain computerised office functions are already possible. For example, an office clerk with a terminal on the desk can type in a telex message destined for another company office, request the status of a customer's account, by typing a code into his terminal. A manager can request the production of a sales report.

Future enhancements to Comsys will include the facility to attach printers to terminals to attach security to prevent the unauthorised use of confidential data, use of mini cassette for data storage and retrieval of data, and a priority rating which will enable the terminal to respond time to be controlled.

Soon, the typewriter and the cabinet will be things of the past. With satellite communications and high speed transmission, data will be moved over the face of the earth at a rate undreamed of 20 years ago. The use of computers in the office will reduce many of the tedious manual tasks associated with office work, leaving people free to use their skills in better advantage.

The future office work station shown in the drawing will perhaps never be built. The technology will certainly exist, but the system will probably bear more resemblance to a genuine hi-fi system than to a radiogram.

Getting your foot in the door
By Boris Sedacca

"OH, NO! You don't necessarily need any qualifications in mathematics to be employed as a programmer," our mathematics teacher was telling us a couple of months before our final school exams. He was himself about to embark upon a lucrative computer career involving a spell as a programmer and progressing to systems analysis.

"Great," I thought. "I can jump the queue and become a programmer right away without wasting my time on a painful period of study at university, which I cannot afford anyway." Computers held a certain mystique for me and I thought I'd like to become a respectable technician.

With this in mind I sent off various letters to users, banks, retail chains, etc but ran into the same wall no matter from which direction I approached; I could only be considered for employment if I had had a training, or wait for it, a degree in mathematics.

"All you need is a logical mind," our mathematics teacher had told us. However, the logic of this situation evaded me completely; where would trained people materials from for new installations? If every existing user made no allowance for the training of new personnel?

"Catch 22 rules OK," I thought. The absurdity of it all enraged me to the point of despondency. At that time I had a friend who was working as an operator for an insurance company. On Friday nights, if we were at a party he would leave at 11.30 pm in order to start the midnight to eight shift. Data processing gradually lost its glamour for me.

I concentrated on developing my career in other directions, but as it turned out I should have persevered. My friend had become a programmer after a while and was working normal hours but had moved well ahead as a professional. I was still pushing a pen.

"Do I hear you say, 'I have problems of my own'?" Well then, this article is not addressed to you but specifically to those who, like myself until very recently, are having difficulties finding their way into a computer career. Employers are always looking for good, trained people.

The computer industry is like a game of musical chairs but with the difference that instead of chairs being gradually withdrawn, they are added with every new installation. The existing players are the experienced and trained personnel and on the outside are the spectators (untrained personnel) hoping to join in the game.

The scramble for chairs among the spectators may leave some of them bewildered and some of them may despair of ever finding a chair. What I'm trying to say is: don't stand there feeling sorry for yourself — DP managers will not come looking for you. So send off those letters now. The first four or five may tax your writing skills but after a while you should find it no problem. Do not be discouraged by rejected applications.

The more times your name crops up with a **Are you having difficulties in finding your way into a computer career? Employers are always looking for good trained people — but what training, and how to get it, is a real problem for the prospective entrant. Boris Sedacca, who found out for himself, offers advice on getting started.**

particular person the more likely that it will be at the forefront of his mind when the time comes for him to look around for new personnel or to pass your name on when one of his colleagues is looking around. In my case, a well-timed letter changed my fortunes dramatically.

Getting back to my analogy with musical chairs, the more you join in the scramble the more likely your chances of success as you start viewing the field from a wider perspective. You might for instance, consider a sales career with a manufacturer to start with. If after a while you find it is not your intention to stay there, you will no doubt have made many useful contacts.

You have to fight off any sense of urgency in finding your career. It may take months or even a couple of years. Tenacity will pay off in the end. By all means find another job in the meantime but keep sending those applications out; and do not act on advertisements alone, as they normally result in a deluge of applications to the advertiser. If possible, try to anticipate the opening before it is advertised.

In the meantime, assuming that like myself you cannot afford for one reason or another full-time study, try to enroll in a part-time course with a computer content.

Some universities and polytechnics offer four to five-year part-time courses for degrees, some with honours, in mathematics, statistics and computer science. However, if you have not enrolled by now you may have difficulties in being accepted in the forthcoming season.

Another valuable course offered at various colleges and polytechnics is that of the British Computer Society, the standard of the Part II examination being recognised as the equivalent of an honours degree in computer science.

It is intended generally for those currently employed in the computer field, but the choice of options in the Part I examination can be so arranged as to make this requirement not essential. Further details can be obtained from the society.

Lastly, colleges and polytechnics offer a variety of courses ranging from the Higher National Certificate in Computer Studies or Business Studies (Data Processing) to non-examinable courses in certain programming languages. If you live or work in London the ILEA Floodlight booklet provides a wealth of information and is available from newsgroups.

Reference libraries will have certain publications such as the Directory of Further Education for a wider national coverage. I have, myself, recently passed the final examinations of the HNC in Business Studies (Data Processing) and been successful. This has undoubtedly helped in my applications.

One of my fellow students, Diane, was a secretary in Scotland before coming down to London and starting the course. Shortly afterwards she joined ICL as a secretary.

I had asked her why she had started the course, and her reply was something to the effect of: "As a secretary I felt that my career was rather limited. Any promotions would have left me doing the same type of job, even if not for the same person."

A few months later, in the second year of the course, Diane learnt from her employers that she would be accepted to their graduate training course beginning after the summer; the first non-graduate to be accepted.

The qualification itself is of an intermediate standard and should enable one to converse confidently and intelligently with computer specialists. The rest, as in Diane's case, is up to you. In conclusion I will raise some general points. An employer's reluctance to train unskilled personnel is only natural when you consider that you will not be of much use to him during your training and that he is ultimately training you for someone else.

Your salary during training will invariably be minimal so that when you have had sufficient experience he will not be in a position to upgrade your salary substantially.

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Towards tomorrow's office

● From Page 15.

the use of word processors to try to avoid typing and retyping of drafts from the unsatisfactory creation of initial drafts.

With regard to telephones, of course, the opportunities for automation are considerable. One big advantage will be the possibility of programmed exchanges where you can, for example, leave a message that a call has been made or if a number is engaged you can ensure that when the line is clear your call will be connected. Various improvements like this will certainly appear in the business market very soon and it should mean considerable savings in time and effort.

Of course, there is the problem that it may be impossible to use your own telephone if several people have instructed the system to call them back when your phone is free. For some time, these developments will occur more or less independently but what we are beginning to see for the future is integration of office systems.

Manufacturers will integrate their equipment into other systems or make link-ups which were not previously considered. For example, the Post Office Viewdata system, essentially linking the telephone and television, provides a facility for storage and retrieval of information and ultimately for communication. It becomes less necessary to have your own set of reference documents if you have a Viewdata terminal and can access some major source relatively easily.

However, other exciting combinations are possible. Once documents are created using word processing systems then it becomes possible, having captured the keystrokes and electronically transcribed the material, to process and manipulate it in a number of ways. There is no reason why it should be turned

into paper straightaway or indeed perhaps at any time since it can be transmitted to another display terminal over telephone wires, stored electronically, or manipulated or added to other information.

So it becomes possible to have an integrated office system with a single means of holding, transmitting or storing documents, letters, forms or whatever. All are handled in roughly the same way and turned into the same type of series of codes and pulses. The resulting interconnected system is rather complex and could lead to problems. For example, it is easy enough to operate a photocopy: you press a button and you get a copy. If you make a mistake, you get extra copies and, like Mr. Coleman and his mustard, many copier manufacturers make a lot of money from people making copies by mistake, however, at least it is relatively fail-safe.

In the worst case you may get 50 extra copies or you may even damage the machine slightly but when systems are integrated into other systems, if you make a mistake in operating the copying system you may well end up ordering stores directly from Australia or cancelling your pay cheque or sounding a bleper in the managing director's office. The increase in complexity as a function of the interconnectedness is considerable. It is quite different operating a system necessary to have your own set of reference documents if you have a Viewdata terminal and can access some major source relatively easily.

As a result, in the short term at least, there may be fundamental differences in the way that the manufacturers sell their integrated office systems. One can envisage that the IBM office systems will be based on typewriters and computers. The Xerox office systems will be based on photocopiers and the

Roneo Vickers office systems may well have grey steel filing cabinets and duplicators as central concepts in their systems. These competing approaches will place emphasis on different types of equipment. In addition, it will no longer be a matter of selling a piece of equipment to a secretary or to her boss, plugging it into a socket, pressing a few buttons and standing back to collect the admiring glances. The selling of complex office systems will involve a considerable degree of tailoring to the needs of the particular organisation.

In the past, computer systems have in many cases been sold on their potential rather than on their actuality. For example, a salesman promised all sorts of possible facilities and the customer had to work with the company and his own systems people to make the equipment work.

This, of course, worked for a time but customers are becoming far more demanding and it is no longer possible for manufacturers to get away with this to quite the same extent. Certainly in the office systems market it will be so competitive that this will not be possible and it will be essential for the manufacturers to sell with their systems (with) expertise in analysing the functions and the needs of the office. This will involve finding out how best to fit automation into the existing office or perhaps redesigning the office to suit the form of automation.

As a result there may be a change in the type of companies offering systems. For example, several software and management consultancies are developing or have developed their own versions contributing to the office system and they are in a particularly good position to meet the needs of clients.

Finally, a few personal biases. We personally do not believe

that the cassette typewriter is a device of the future because the prices are still relatively high and having gone to the trouble of electronically capturing keystrokes it seems a terrible waste to immediately print it on a piece of paper even though you do have an electronic record of what it is. They are not necessarily any more natural or convenient than typing on to a television screen and you can then do the editing much more readily. What they gain in the naturalness of their initial presentation they lose in the unnaturalness of their editing procedures.

Secondly, with electronic office systems linked to a telephone network there is very little limitation on where the equipment can be placed. Therefore it has been suggested that in the future people will work at home doing an hour or two of work and then going back to growing vegetables. This facility may work in some cases; but what we believe it will not do is replace most people's need for a place of work. After all, we get more from work than simply performing a task and earning money. Many people will still want a place of work, to have workmates, be able to use the company's telephone or make private photocopies or chat to the person in the canteen.

However, that is not necessarily true for everyone, and there will be some people who may well be prepared to do their work, say at home, in isolation, either because, for example, their children have to be looked after — this will apply to both males and females — and therefore the work has to be fitted round baby-sitting, or because work has become a less important part of their lives.

Another myth which we believe is untrue is that meetings will disappear. Certainly there are many cases where the

provision of video or the instantaneous viewing of documents will greatly extend the possibilities of existing telephone conversations. However, there is some evidence that for more delicate and complex communications, there is something about face-to-face which we think makes it an easier process which people prefer.

We also believe that the secretary in the future will become far more of an information assistant and equipment handling assistant and therefore a more equal member of the partnership.

None of these developments will occur overnight and for many years there will be varying degrees of automation in different offices.

Finally, there will be an even greater need to apply ergonomics knowledge to office system design. At present, people have considerable scope for adapting and modifying their immediate working environments. If you are trying to read a piece of paper you can move it and yourself to a place where the light is more suitable. However, with large integrated work stations with everything to hand it is essential that the design is right. Indeed, it may never be right to construct such work places. They may be acceptable in Sweden or Japan where workers can take regular breaks for gymnastics but this does not seem likely in the UK.

A certain amount of mobility is desirable but may be essential, provided that it is not taken to extremes, to avoid postural problems and even eye strain and headaches. The future office work station shown in the drawing will perhaps never be built. The technology will certainly exist, but the system will probably bear more resemblance to a genuine hi-fi system than to a radiogram.

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There are many possibilities for improving the techniques of Transportation Planning. Some of our ideas include an investigation into the use of household regression for trip generation models, and a time series analysis of traffic count data. We are looking for somebody with an appropriate degree and experience of Fortran and IBM O/S to help us in this work and to co-ordinate the computing efforts of the engineers and technicians in the Transportation work of the County Surveyor's Department. A background in transportation planning would be beneficial, however, we would still be interested in hearing from people who are keen to broaden their experience in this field. Please Roger Jones on Chichester 85100, ext. 585, to find out more about the job and our extensive computing facilities. Removal and resettlement allowances are available in approved cases plus temporary lodging allowance. Temporary accommodation may also be available. Application forms from The County Surveyor, West Sussex County Council, Chichester, Sussex, PO18 1RH. Tel: Chichester 85100, Ext. 413/458. Closing date: 24th October, 1977.

ANALYST/PROGRAMMER

NEW MALDEN

SALARY CIRCA £5,500

We are a rapidly expanding, privately owned, successful group, operating in the industrial/commercial catering industry. A young data processing professional is required to develop, implement and operate a variety of very interesting and unusual systems on our IBM system/32. The candidate should have had previous experience as an analyst/programmer and have a detailed working knowledge of RPGII on small IBM computers. Familiarisation with FORTRAN would be advantageous although not essential.

Please contact:
Ken Elliott
The Veness Group Limited
253-257 Piper House
Burlington Road, New Malden
Surrey KT3 4NG
Phone: No. 949 3477

MINI-REVOLUTION

SALES EXECUTIVE

Basic c. £6,000 + comm.

Fabulous opportunity to keep ahead by joining major US group marketing a much sought after Mini-Computer (over 5,000 systems installed in 1976). Your market will consist mainly of OEM users where you can derive maximum sales from both buying thereby yielding an income in excess of £10,000 p.a. You will need to be confident and ambitious with sales experience and living in London or Home Counties. Start basic around £8,000 + O/S Car. Call ref. 551018.

35 EXECUTIVE (KINGSTON) 01-546 9473

COMPUTER MANAGER

Salary Grade PC1 (3-7) £4982-£5677
Plus Supplements £520 Approx.

This is a challenging position for someone to play an important part in the future development of the Council's Computer facilities, which includes: The Council's existing tape based ICL 1901, being replaced by a mixed tape/disc configuration which is due to be completed by September, 1978. The successful applicant should be able to demonstrate proven management ability and experience and knowledge of PLAN, COBOL and other suitable programming languages. Experience of disc and tape based systems, communications and the conversion of systems to high level languages is required. Housing accommodation may be available in approved cases and the Council operates a resettlement and removal allowance scheme. Casual car user allowance will be paid.

Application forms are available from the Personnel and Management Services Officer, Chief Executive's Department, Council House, Cotton Road, Nuneaton, Warwickshire CV11 1SA. Closing date for applications 24th October, 1977.

NUNEATON

PROGRAMMER

We have a vacancy for a programmer to assist with the maintenance and development of systems operating on our IBM System/3. Although preference will be given to those with RPG II, experienced programmers with other languages will be considered.

The work is both interesting and challenging, and the environment friendly and professional. There is scope for personal development and the opportunity to make full use of one's abilities.

The Company is the largest independent company in the poultry production and processing industry.

The Head Office is situated in a pleasant rural area.

Application forms available from:
Group Personnel Manager
G. W. Padley Limited
Anwick, Sleaford, Lincs.

ASSISTANT EDITOR

To work on Systems International, a monthly computer magazine with offices at Upper Norwood. The job entails technical writing using knowledge of computer science, electronics, systems analysis, design engineering, software, etc., with an opportunity to learn about publishing. In the first instance apply in writing to: The Editor, Systems International, 108 Church Road, London, SE18 2UB. Tel: 01-771 3614.

LONDON BOROUGH OF BRENT

WILLERDEN COLLEGE OF TECHNOLOGY

COMPUTER ASSISTANT (LECTURER GRADE 1)

Applicants are invited for the post of Computer Assistant. The post involves:
1. Assisting in the day to day running of the College Computer Centre (PDP-11, 200) and the development of new application programs.
2. A maximum of 10 hours teaching Computer Studies in any of the College's seven departments. This may include teaching on GCE A level GCEI 746/747 and TEC Engineering courses.

Candidates should normally hold a degree/BSc or equivalent qualification and have experience in at least one of the following languages: FORTRAN, BASIC, an Assembler language. Interested applicants are invited to submit a curriculum vitae to the Head of the College, Willerden College of Technology, 1000 Wilton Road, London, NW10 2ND. Tel: 01-484 0147. Informal assistance available in approved cases.

IBM Op
C. London c4400

ICL S/Ldr
Surrey £3800

Phone 01-439 6481
(24 hours)

EFFECTIA GRAVIS
Personnel Consultants

DEAKIN UNIVERSITY

Geelong, Australia

SCHOOL OF SCIENCES

PROFESSOR OF COMPUTING

Deakin University was incorporated in 1970 and on 1 April, 1977, absorbed into the University of the Eastern Victoria of Geelong. The University is a member of the Association of Universities in Victoria and is a member of the Association of Universities in Australia. The University is a member of the Association of Universities in Australia. The University is a member of the Association of Universities in Australia.

Applications are invited for the position of Professor of Computing. The School of Sciences is a member of the Association of Universities in Victoria and is a member of the Association of Universities in Australia. The University is a member of the Association of Universities in Australia. The University is a member of the Association of Universities in Australia.

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ICL S/Ldr
Surrey £3800

Phone 01-439 6481
(24 hours)

EFFECTIA GRAVIS
Personnel Consultants

SAUDI ARABIA

Whittaker Life Sciences Group is operating a Health Services Project for the Saudi Arabian Government which includes hospitals in Jeddah, Tabuk and Khams Mushayt. Due to the expansion of the project and the resulting requirements for additional computer systems, vacancies have recently arisen in the Jeddah Data Centre:

Systems Analyst To U.S. \$18,000 P.A. Tax Free
A minimum of two years experience in systems plus two years programming is required. Practical experience of IBM 404 or 370 under DOS is essential and some knowledge of RPGII or BAL would be useful. The work will be initially on Supply, Finance and Employee-related systems.

RPG II Programmers To U.S. \$14,000 P.A. Tax Free
A minimum of two years programming experience is required using RPG II on IBM equipment. Knowledge of DOS VS/PAVER is desirable and some experience with another programming language would be considered an advantage.

The initial contract is for a two-year period and applicants must be single or married with no children. The contract includes travel accommodation, six weeks vacation each year, free medical care and a contract completion bonus of one month's salary.

The successful candidates will have the opportunity to save a considerable sum of money whilst enjoying the outdoor activities in the sunny climate of a stable Middle Eastern country.

For further information and an application form, contact:
Whittaker Life Sciences Ltd.,
76 Grosvenor Street, London W1. Telephone 01-499 4195.

Whittaker
Life Sciences Ltd

Unusual Opportunity for an Agency Interviewer

We are in the process of establishing a Computer Staff Recruitment Consultancy in central London. We are seeking applications for the post of Managing Director. Successful candidates will be aged between 28/40 with a background in computer science, electronics, systems analysis, design engineering, software, etc., with an opportunity to learn about publishing. In the first instance apply in writing to: The Editor, Systems International, 108 Church Road, London, SE18 2UB. Tel: 01-771 3614.

Applications should be made in writing to: John Marcor, Helmut Staff Services Ltd., 17 High Street, Walton-on-Thames, Surrey. Tel: Walton (88) 40447.

NORTH AND MIDLANDS AREA

SYSTEM PROGRAMMER, WEST YORKSHIRE, £3.5K
The programme is to be developed in use of the IBM 370/158 computer. The programme is to be developed in use of the IBM 370/158 computer. The programme is to be developed in use of the IBM 370/158 computer.

GRADUATE, SHEFFIELD, £3K plus
The graduate will be responsible for the development of new application programs. The graduate will be responsible for the development of new application programs. The graduate will be responsible for the development of new application programs.

PROGRAMMER, LEICESTER, £3.5K
The programmer will be responsible for the development of new application programs. The programmer will be responsible for the development of new application programs. The programmer will be responsible for the development of new application programs.

PROGRAMMER, WEST YORKSHIRE, £4K plus
The programmer will be responsible for the development of new application programs. The programmer will be responsible for the development of new application programs. The programmer will be responsible for the development of new application programs.

ANALYST/PROGRAMMER, LEEDS, £4.5K
The analyst/programmer will be responsible for the development of new application programs. The analyst/programmer will be responsible for the development of new application programs. The analyst/programmer will be responsible for the development of new application programs.

JUNIOR PROGRAMMER, YORK, Salary Neg.
The junior programmer will be responsible for the development of new application programs. The junior programmer will be responsible for the development of new application programs. The junior programmer will be responsible for the development of new application programs.

PROGRAMMER, MANCHESTER, £4K
The programmer will be responsible for the development of new application programs. The programmer will be responsible for the development of new application programs. The programmer will be responsible for the development of new application programs.

SALESMAN/SALES MANAGERS, to £12K for MANCHESTER, NEWCASTLE, LEEDS, LEICESTER, BIRMINGHAM.
The salesman/sales managers will be responsible for the development of new application programs. The salesman/sales managers will be responsible for the development of new application programs. The salesman/sales managers will be responsible for the development of new application programs.

The above are typical vacancies only. If you call to a better career, telephone the D.P. position.

COMPUTER RECRUITMENT
QUEEN'S ROAD MILLS, HALIFAX HX1 4LR
HALIFAX 58232

PROGRAMMER — APPLICATIONS PERSON

Salary range £4,500 to £5,500

A programmer — applications person is required to assist in developing, commissioning and installing text processing systems for the Graphic Arts industry. The systems are based on the DEC PDP-11 series computers, and since the successful applicant will be expected to make an immediate contribution to software development, only persons of proven PAL-11 programming ability will be considered. In addition, the person employed will occasionally be involved in the applications training of customer's personnel. Experience of computer applications, in the printing industry, or program development under DOS 10, would be an advantage.

Please telephone 01-997 8053 for further information, or send details of previous experience to:

Mike Brown
Graphic Arts Equipment (Hendrix Division)
11 Antee Road
Purville
Greenford, Middx.

SALES EXECUTIVE

PORTABLE DATA TERMINALS

LOCATION — North of England

YSTAT INTERNATIONAL, the world's leading supplier of Portable Data Capture Terminals, is currently expanding its European operation. As part of this plan we are seeking a self-motivated, experienced sales executive to be responsible for the sale of our products in the North of England and Scotland. The successful applicant will be based in the Manchester or Leeds area, and will have a proven track record of systems selling to the Retail and Distribution sectors. An applicable salary commensurate with experience is offered, together with a 15% commission on gross sales in excess of £8,000 per annum. A company car will be provided. Please apply, giving brief details of career to date, to:
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YSTAT INTERNATIONAL INC.
Data House
St. Ives Road, MAIDENHEAD, Berkshire SLK 1QX

ANALYST PROGRAMMERS

To £4,400

NEAR SLOUGH
A well-known manufacturer of household products requires a Programmer with knowledge of COBOL, RPG or BAL to run as an Analyst/Programmer. New developments are in progress control, distribution and MIS.

SYSTEMS ANALYST To £5,500
RUSLIP
A service organisation numbering large multinationals among its clients offers a challenging position to an Analyst with two years' systems experience.

ASSEMBLER PROGRAMMER To £4,400
N.E. SURREY
Ideally one year's programming in ASSEMBLER required by large company, but programmers with COBOL wishing to learn ASSEMBLER will be considered.

OPERATORS To £3,000
N. SURREY
Experienced IBM 370 operators living locally and with 'O' or 'A' levels required by large progressive company. Shift work.

Please phone for an Application Form.

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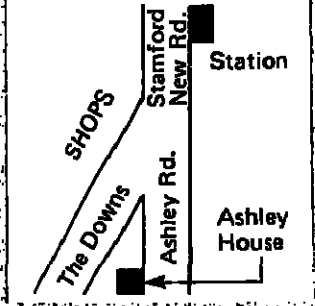
ANALYSTS & PROGRAMMERS

INFORMAL OPEN EVENING IN ALTRINCHAM
Tue, Wed, Thurs; October 11, 12, 13; 6-9 pm.

Thinking of a change...?

Then why not call in to discuss a very wide range of local career possibilities with Quadrant Software or through Quadrant Recruitment. Drinks, snacks, ample car parking. It will be well worth an hour of your time.

QUADRANT COMPUTER SERVICES LTD, Ashley House
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Racal Milgo Limited, the leading supplier of DATA COMMUNICATIONS EQUIPMENT in the U.K. and Europe, have vacancies for two people (male or female) to operate in the U.K. Sales Department as Internal Sales Engineers in Reading. As part of a highly productive and enthusiastic area team they will be responsible for internal liaison and operational functions in the interesting, commercial field of computer related equipment. The individuals we require must have a high motivation ability as well as a certain amount of technical ability, but above all an enthusiasm which will be mirrored to our customers. They will have a real desire to progress in an active and thriving commercial environment.

They will be working with Sales Engineers who have progressed to these positions from Internal Sales Engineers and therefore the opportunity for advancement is considerable. If you require further details of these positions, telephone our U.K. Sales Manager, Alan Gill, on Reading 85282 or alternatively write giving full details to:

V. W. Bowen,
Director of Finance and
Administration,
RACAL MILGO LIMITED,
Barnet Road,
Reading, Berks.
RG2 0SS.



RACAL
The Electronics Group

Project Management in a Systems Development Environment - £6000+

Cadbury Schweppes have established a number of project teams involved with the development, implementation and maintenance of on-line computer systems using new techniques in addition to the usual batch techniques. The increasing scope and facilities of our Bourneville computer centre make the management of these teams an exceptional challenge to imaginative computer professionals.

The Manager we are looking for will be a graduate or professionally qualified specialist, aged 30+. He or she will be able to demonstrate a high degree of technical skill and experience of on-line techniques in a data processing environment. Personal qualities will include the creative thinking necessary for the design and maintenance of flexible systems that will service many users' drive, determination and a firm grasp of the necessary management skills.

Current Equipment

IBM 370-145 + 370-158 mainframes

Future Plans

2 168 main frames to support increasing CICS

on-line and IMS data base demands

MYB operating system

3800 laser printer

3850 mass storage

VSPC for interactive program developments

A salary in excess of £6000 p.a. is envisaged and there is a wide range of executive fringe benefits, including generous relocation expenses. Excellent career development opportunities exist within the Cadbury Schweppes Group. Does your background and experience qualify you for this challenging and rewarding opportunity? Then telephone or write for an application form to the Company Recruitment Manager, Cadbury Schweppes Limited, Bourneville, Birmingham, B30 2LU. Telephone 021-488 7343.

(NOTE: A complementary appointment is to be made with the emphasis on the development and implementation of financial systems. For further information please telephone.)

Cadbury Schweppes

YOUNG PROGRAMMERS

"If you are career minded read this advertisement!"

SALARY CIRCA £4,000 P.A. PLUS ABOVE AVERAGE FRINGE BENEFITS

CAMBRIDGESHIRE/NOTTINGHAMSHIRE

Our client, a privately owned company that supports and sells an integrated series of products being amongst the most successful software products available within the United Kingdom. These products enjoy acceptance in many major mainframe installations, and are generally regarded as being the most complete and best supported in their particular application area. **INTERNAL DEVELOPMENT**, coupled with our client's **GROWTH PLANS**, has led to the necessity of recruiting further **PROGRAMMERS** who wish to develop their careers and become **KEY MEMBERS** of the company.

Interested candidates should have:

- * Six months' to two years' COBOL and/or BAL and/or Plan experience gained in a formal programming environment.
- * The necessary qualities and attitudes to work in close contact with clients.
- * A preparedness to travel.
- * The ability and desire to develop both your skills and your career.

Our client offers:-

- * **THE OPPORTUNITY TO BECOME INVOLVED IN SYSTEMS DEVELOPMENT AND IMPLEMENTATION**
- * **COMPLETE AND ON-GOING TRAINING FACILITIES**
- * **A STIMULATING WORKING ENVIRONMENT AMONGST PROFESSIONALS**
- * **AND ABOVE ALL, PROVEN GENUINE LONG TERM CAREER PROSPECTS.**

THE COMPANY OFFERS EXCELLENT (ABOVE AVERAGE) FRINGE BENEFITS INCLUDING: Interest free car loans/substantial travelling allowance/four weeks' holiday/11% non-contributory pension scheme/free BUPA/interest free personal loans/substantial relocation assistance/etc.

If you welcome the challenge in a stimulating, professional environment where your own personal development is assured then contact without delay:-

REG HEATH 021-236 3781

REF. NO. 77/0/1

SCR

OS OPERATORS REACHING FOR THE TOP TAKE-OFF in NORTH SURREY

To £4,000

Can you honestly expect to receive planned technical training and a career path leading towards:

- * Operations technical support
- * User liaison and trouble-shooting
- * Programming
- * Junior management

That is unusual in itself!

What is more interesting is the current large 370 environment, including Time-Sharing, Real-Time and a UK network.

To qualify for this prime position, you require:

- * 18 months' OS experience (knowledge of HASP would be useful).

The installation, servicing a demanding Group, "hums" with activity. Shifts are broken into small teams, and promotional opportunities are first-rate.

Rewards include: 22 days' holiday, company products discount, sports and social facilities, and a challenging future with a major UK company heavily committed to data processing.

CONTACT: LONDON OFFICE on: 01-935 0671

REF: 77/10/2

SPECIALIST COMPUTER RECRUITMENT LTD.

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Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST

Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0671 FREEPOST 6

Freepost 6, 102, Blandford Street, London W1E 1JZ



NCR offers Systems Analysts rare opportunities in Marketing.

NCR's Commercial & Industrial Sales Division is where you'll find the scope you probably won't get if you simply stay with analysis.

Where you can use your business experience and flair for innovation to earn yourself, not only a highly competitive salary, but also, if you want it, a ticket on the route to hardware selling. Which is where the really big incomes are.

You will be involved in marketing and promotion of NCR systems for the manufacturing or distribution industries - liaising between the technical, where you've been, and sales, where you may wish to go.

To do the work, you need to have had plenty of

applications experience already - preferably all the way from system conception to completion. Basic business know-how is important, and any previous marketing experience a distinct advantage.

You will be thoroughly trained. You will receive a full range of NCR company benefits. Since you will be expected to travel a fair amount, you will be paid expenses, too. But you will also be expected to live within daily commuting distance of London.

Rare opportunities. Don't miss yours.

Write to Harry Redington, Personnel Controller, NCR Limited, 206 Marylebone Road, London, NW1 6LY

NCR

NORTH WEST THAMES REGIONAL HEALTH AUTHORITY

COMPUTER CENTRE

Colney Hatch Lane, New Southgate, London N11 3DW

The following vacancies exist, based at the Regional Computer Centre at New Southgate, for experienced computer staff to work on a variety of accounting, payroll, medical and scientific applications. The Computer Centre is equipped with a large ICL 1904S computer supported by document readers, REDIFON key to disc systems and NCR microfiche processor. In addition a wide variety of mini computers are installed in individual hospitals and laboratories around the region.

Ref. No. 194 SENIOR SYSTEMS DESIGNER / PROGRAMMER

Salary Scale: £4,882 to £5,857

Ref. No. 195 SENIOR PROGRAMMER

Salary Scale: £4,408 to £5,218

Ref. No. 196 PROGRAMMER

Salary Scale: £3,524 to £4,408

N.B. The above salaries are inclusive of London Weighting, Stage 1 and Stage 2 awards.

The Computer Centre is a modern purpose built self contained unit standing on its own grounds. A pleasant working environment is further aided by a FLEXTIME system around a 36 hour week and adjacent canteen facilities.

Application form and job description available from the Regional Personnel Office, North West Thames Regional Health Authority, 40 Eastbourne Terrace, London W2 3QR (Telephone No. 01-282 8811 Extension No. 281) quoting the appropriate reference number. Closing date 21st October, 1977.

University of Nottingham

SAMMIE

Computer Aided Workplace Design

SAMMIE is a computer aided ergonomic design system used to design equipment and workplaces. A vacancy exists for a research assistant to join this S.R.C. funded team in the Department of Production Engineering and Production Management. The successful applicant will be required to investigate and solve problems for potential users in industry and public bodies and to encourage the use of SAMMIE in new applications. Extensive computing facilities are available. Salary in range £2,804 - £4,403.

Further details and application form, reference number 1204 October 1977, from the Staff Appointments Office, University of Nottingham, University Park, Nottingham NG7 2RD. Ref. No. 532.

PROGRAMMERS

I) APS/801 grade £3825-£4545 + £312 + stage 2 + £285 London allowance.

Applicants should have experience of applications programming in the fields of engineering and the sciences, preferably with a degree in an appropriate subject. A knowledge of the 1900 Gino-F system would be an advantage. It is intended that the person appointed will devote half the time to the supervision of documentation within the Unit.

II) APS/4 grade £2922-£3702 + £312 supplement + stage 2 + £285 London allowance.

The programmer is required to assist in providing a service to users mainly in the fields of science and technology. Experience of graphics systems (e.g. Gino-F) an advantage and candidates should possess a degree or other qualification in a relevant subject. Knowledge of Elliott 4120 an advantage.

III) APS/4 grade £2922-£3702 + £312 supplement + Stage 2 + £285 London allowance.

Applicants should have experience of applications programming in either engineering or commerce. For the latter a good knowledge of Cobol is required. Possession of degree or other qualification desirable. Knowledge of Elliott 4120 an advantage.

Further details and application forms from Assistant Registrar (Personnel), Kingston Polytechnic, Penryn Road, Kingston-upon-Thames KT1 2EE. 01-549 1390.

SENIOR DATA CONTROL CLERK

ICL 1900 GHI Essex installation. Two years experience. Days only position.

Salary to £3300

SHIFT LEADER

Three years' experience with IBM 370/125 DOS/VS. Age immaterial. Three shift system - Surrey installation.

Salary £4300 + O/T

DATA CONTROL CLERK

Two years' experience in control shift work. Age 19-20 - City company.

Salary to £3000

JUNIOR COMPUTER OPERATOR

Six months + IBM 370/DOS/GRASP/VS experience. Three shift system for SE1 company.

Salary £3000

UNIVAC 1106 OPERATORS

Four shift system preferably one year + experience on Univac, but will take any experience. W.2 installation.

Salary to £3500

ICL 1900 OPERATORS

N.W. 1 installation require experienced operators for a four shift system - good promotional aspects for people with GHI experience.

Minimum £3000

HONEYWELL OPERATORS

One year + experience and some ICL would be preferable. Three shift system for an Essex company. (Travel allowance.)

Salary to £4000

ICL 2903 OPERATORS

NW9 installation require 2903 or 2904 experience for their two shift system. Preferably one year or more experience.

Salary £3600

PHILIPS MINI OPERATOR

W.C. 1 company require one year experience. Lots of client contact, days only.

Salary to £3500

OPERATORS

IBM 370/OS experience for Essex installation. Two shift system, eighteen months + experience.

Salary £3000

OPERATORS

IBM 370 DOS for an East London installation. Two years + experience for two shift system.

Salary £3600

MINI COMPUTER OPERATOR

Eighteen months' + experience on any small installation for a days only position in Bucks.

Salary to £3600

COMPANIES LOOKING FOR STAFF?

Telephone Avril Lively with details of your vacancies on:

01-402 0933

ICL OPERATOR

Two years' + experience ICL 1900 GHI must have knowledge of MACRO Central London company - days only.

Salary £3500

IBM OPERATOR

IBM 360/OS MVT HASP experience. Three shift system - two years experience for Middlesex company.

Salary £3750

STAFF LOOKING FOR JOBS?

These are just a selection of our vacancies that we have available. For more details of these and more ring Avril Lively on:

01-402 0933

AJK RECRUITMENT LIMITED (Emp. Agy.)
26 Chilworth Street, Paddington, London, W.2

01-402 0933

ajk

JBA**Technical Authors**

West of London up to £7000+
Our client seeks: WRITERS with several years experience in EDP ideally in a software environment; PROGRAMMERS with writing flair who want a creative satisfying job (career change); GRADUATES who may not have considered writing as a career. Ideal candidates will be highly personable and have an appreciation of real-time high level languages.
We also have vacancies in other areas offering excellent salaries and prospects.

Contact: Mike Creamer.

Software Specialists

London & Berkshire up to £6500
One of the largest software houses in Europe has vacancies for specialists to develop new software.

The projects include work for communications, operating systems, emulators and compilers and they require professional staff with 2 or 3 years experience in one of these fields. The client can offer a challenging environment and the chance to travel.

Salaries are negotiable according to experience.

Contact: Jim Baker

Minicomputer Programmers

London & Home Counties up to £6000
Our client, a large international organisation with several locations around London, has opportunities for programmers to work on minicomputer systems. Applicants must have at least two years experience in the development of small real-time applications, preferably with a commercial bias although technical backgrounds will be considered.

Excellent salaries and career opportunities.

Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES

International Personnel Consultants

16 Maddox Street, London W.1. Tel: 01-491 4478

Programmer/Analyst

West of London - U.S.A. up to £8000
This manufacturer of technical micro-based business systems seeks a presentable and qualified person with M/CODE and ASSEMBLER experience and a background of micro-processor (or mini) based systems, together with recent involvement of both terminal hardware and communications software. Work involves a lot of customer liaison, occasional visits to the U.S.A. and possibly, later, world travel.

Relocation assistance and excellent salary for the right person.

Contact: Mike Creamer

COBOL Programmers

London (Central) up to £4500
Several of our clients are urgently seeking COBOL programmers, even with as little as 6 months post-training experience on any type of equipment. Positions offer excellent opportunities, variety of work, and definitive career progress to systems analysis.

Prospects, good salaries, and interesting work for competent people. Immediate interviews.

Contact: Mike Creamer

Systems Programmer

Herts c. £5500
A well established and expanding manufacturer wishes to appoint a software programmer whose main responsibility will be for the development and enhancement of executives and telecommunications software. It is essential to have a sound academic background and have spent at least three years working in a systems programming environment. Knowledge of a communication system would be an advantage.

Relocation expenses will be paid as necessary.

Contact: Margaret Stevens

Systems Engineer / Computer Programmer

HAWKER SIDDELEY AVIATION

Based in our Avionics Department at Dunsfold Aerodrome, the successful man or woman will be required to develop software concerned with real-time flight simulation and on-line equipment control.

Ideally, you will be qualified to degree standard and have experience with PDP 11 using FORTRAN and ASSEMBLER under the RSX-11D Operating System.

We will pay you a good salary and facilities include a Pension and Life Assurance Scheme, a subsidised canteen and an active Sports and Social Club.

Please write or telephone quoting CW/78 to:

The Personnel Officer
Hawker Siddeley Aviation Limited
Dunsfold Aerodrome
Nr. Godalming
Surrey
Telephone: Cranleigh 2121

BRITISH AEROSPACE COMPANY**HOLLAND:**

Professional Programmers, Operators and Punch Girls required for lucrative contracts in the Amsterdam area. Details and C.V., plus phone no. if possible, to:

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Cobol Programming B3700 Woking

Our B3700 at Woking is linked with TC 3500 remote computers at our factories in Liverpool and Southampton and is used for a wide variety of applications. The expanding demand for our services means that we are looking for experienced people to join our team. The Management Services Department is responsible for O & M and Operational Research as well as computing, and there are opportunities to progress to the Business Analyst field. The Company is the UK arm of the B.A.T Group's tobacco interests and has a large and growing export business: we market tobacco products in 160 countries.

Applicants should have around 2 years COBOL programming experience, not necessarily with Burroughs equipment.

Salary circa £4,500; assistance will be given with re-location expenses.

To apply, please send details to:-

D. J. Smith,
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Woking, Surrey, GU21 1YB.

or, if you wish to discuss the position, telephone
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For further details:

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The senior position demands 4 years' systems experience, including working with on-line systems, and the ability to exercise team-leadership skills.

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L.W. Tibbott - Personnel Manager
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Woodworth Building, 10, New St., B2 4HU

BRISTOL (0272) 211035
Equity and Law Building, 40, 42 Colston St., BS1 1NR

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Anglia House, 24-26 Frederick St., EH2 2JR

CRAWLEY (0293) 514071
36 The Broadway

Geophysical Data Processors Libya

AGECO is a national oil company operating in the Socialist Peoples Libyan Arab Jamahiriya. We are primarily engaged in oil production from finding new sources to pumping the crude to local users and termini, and have a daily output of nearly half a million barrels.

At present we are putting together a team of geophysical data processors, to be based at our head office in Benghazi, who are familiar with *Command II* or *Phoenix* system and routine. We invite applications for the following positions.

Senior Seismic Data Analyst

Applicants should have a University degree or equivalent with at least five years experience in field operations and an understanding of the principles of seismic interpretation. Job ref. No. GP/B1.

Seismic Data Analyst

As with the senior position, applicants should have a degree and a thorough knowledge of seismic work, but only three years experience are necessary. Job ref. No. GP/B2.

Seismic Computer Operator

You will be required to assist analysts in assembling data and will, on occasions, be given the responsibility of running various programmes. Applicants should have had two years relevant experience. Job ref. No. GP/B3.

All these bachelor posts carry extremely high salaries on which you are allowed to remit some 90% of the net. The successful candidates will be required to work on the basis of one week off for every seven full weeks work, with the company paying the return air-fare to the UK at each field break. There are numerous other very attractive fringe benefits.

Please write, quoting job reference number giving details of age, nationality, marital status and a brief résumé of career to:

AGECO

The Arabian Gulf Exploration Company (UK), 35-38 Portman Square, London W1H 9PH

**COBOL PROGRAMMERS****SURREY****to £5000 + + + +**

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If you have two or more years Cobol, there could be a place for you. Assembler, TP and Database experience would be helpful although training will be given.

Salaries are up to £5000 plus house purchase loans at preferential rates after a qualifying period, in approved cases.

Career prospects are excellent, and additional benefits include flexitime, free lunches, generous discounts on all insurances and much, much more.

Interested? Contact Geoff Mackenzie, Computer Appointments, 64/62 Regent Street, London, W.1 or telephone 01-439 6299

Computer Appointments Register

Regent Street, London W.1. Tel: 01-439 6299
Computer Appointments Register

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I have lots of extremely interesting jobs on file for Operations Staff from Trainee Operator to Operations Manager. If you are contemplating a change why not ring me — I may have the perfect job for you.

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(or large M/Frame)	London to £3500
OP PDP pref.	

Contact: MARILYN DAVIDSON

SKILLTRAIN TO THE USA

London Interviews: October 17th

Our clients from Connecticut are coming to London to recruit a team of D.P. professionals on a contract basis.

If, as an Analyst/Programmer, you can provide experience of O.S. Cobol acquired on large-scale projects in a manufacturing environment, we would be pleased to provide the ticket and an excellent salary package. The company is heavily involved in the use of database techniques, so expertise in this area would be an advantage; however, this is not essential.

To arrange an interview with our clients,

Contact: LINDA BENSTED

JUDGE WANTED

To be trained as a Personnel Consultant. Female or male, but must be a good judge of people — their technical skills and personal characteristics.

A systems or programming background is desirable but most important is your perception, communication, ability, initiative and ambition.

Promotion of existing personnel to our New York office creates this vacancy.

If you are interested in this position and would like to discuss it further,

Contact: MARILYN DAVIDSON



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C. £4K
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An exciting expansion and development programme has created three additional vacancies within a major financial institution located in the glorious West Country. A branch terminal network: database implementation; extension of local TP, are the three development areas.

Experience of PL/I is preferable but Cobol and/or an Assembler would also be acceptable.

This very attractive package includes a realistic salary, assistance with house purchase, BUPA group scheme, pension, life assurance, etc.

For an early interview urgently phone AB Executive on 0272 46085.

ab executive (Bristol)

RPG II PROGRAMMER

We currently operate an IBM system 3/12, applications cover marketing, manufacturing and finance, on-line systems are now being developed. Applicants should have 1-2 years' RPG II experience preferably on system 3. A knowledge of Bomp and CCP is desirable but not essential as relevant training will be provided. Write or telephone for an application form.

Personnel Manager
BRITISH TWIN DISC LTD.
Knight Road, Strood, Rochester, Kent
Telephone: Medway (0834) 77855

Faculty of Business (Barking Precinct) Department of Systems & Computing Studies

Lecturer II Appointment

Applicants for this post should have recent commercial, industrial or teaching experience from among the areas of information systems, database technology and operating systems. Appropriate academic qualifications required and experience of ICL 1800 series would be an advantage. (Ref. S/BE 121).

Salary Scale: Lecturer II £3,279 - £5,493
(Plus appropriate Government Supplements of up to maximum of £482 and appropriate London Allowance).

Further details and Application Form from
The Senior Staffing Officer (2)
North East London Polytechnic
Forest Road, London E17 4JH
Telephone: 01-827 2272 (Extension 20)

Closing date: 17th October, 1977.

NELP North East London
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IRELAND SYSTEMS ANALYST/ DPM DESIGNATE

We are an International Pharmaceutical Company and have recently installed an ICL 2903.

We wish to appoint a Systems Analyst with considerable experience in the design and implementation of commercial systems, to develop and run our existing DP Department. It is envisaged that the suitable candidate will become Data Processing Manager within a short period of time.

An attractive salary will be offered and the Company operates a non-contributory Pension and Life Assurance Scheme. Relocation expenses will be paid where appropriate. Please write with full career details to:

The Financial Controller
ANTIGEN LIMITED
Roscrea, Co. Tipperary

COUNTY TREASURER'S DEPARTMENT

Computer Services Division

Systems Analyst

GRADE AP4/5. £3861-£4615 inclusive of supplements
POST REF. T249

Applications are invited from persons with at least twelve months' experience of systems analysis, or from experienced programmers with local government or commercial backgrounds and experience of the systems environment.

The successful applicant may expect to be employed upon a wide range of applications, on some occasions working as a member of a team and on others in a more individual capacity. He/she must, therefore, be capable of negotiating with the representatives of user departments at all levels and of being responsible for a development from investigation through to implementation.

Closing date 22nd October, 1977.

Senior Software Programmer

GRADE S01/2. £4238-£4982 plus up to £280 p.a. supplements.
POST REF. T275

Applications are invited from suitably experienced persons, who must have a good knowledge of the operating system and other standard ICL issued software. The successful applicant will lead a small team of specialists, who are responsible for all system software, including Communications Manager and Datadrive.

Closing date 18th October, 1977.

The County Council, situated at Barnsley, has a 182K ICL 1804S computer running under the George III Operating System, and supporting an extensive MOP and communications network, which includes a Direct Data Entry/Enquiry System.

Current applications range from conventional batch to real time systems and developments involving integrated database techniques are envisaged in the near future.

Please — telephone or write for an application form, quoting the post reference to: Chief Executive (Personnel), South Yorkshire County Council, County Hall, Barnsley S70 2TH, telephone Barnsley 88141, Ext. 288.

**South Yorkshire
County Council**
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We are looking for experienced

SYSTEMS PROGRAMMERS SYSTEMS DESIGNERS BUSINESS ANALYSTS PROGRAMMERS

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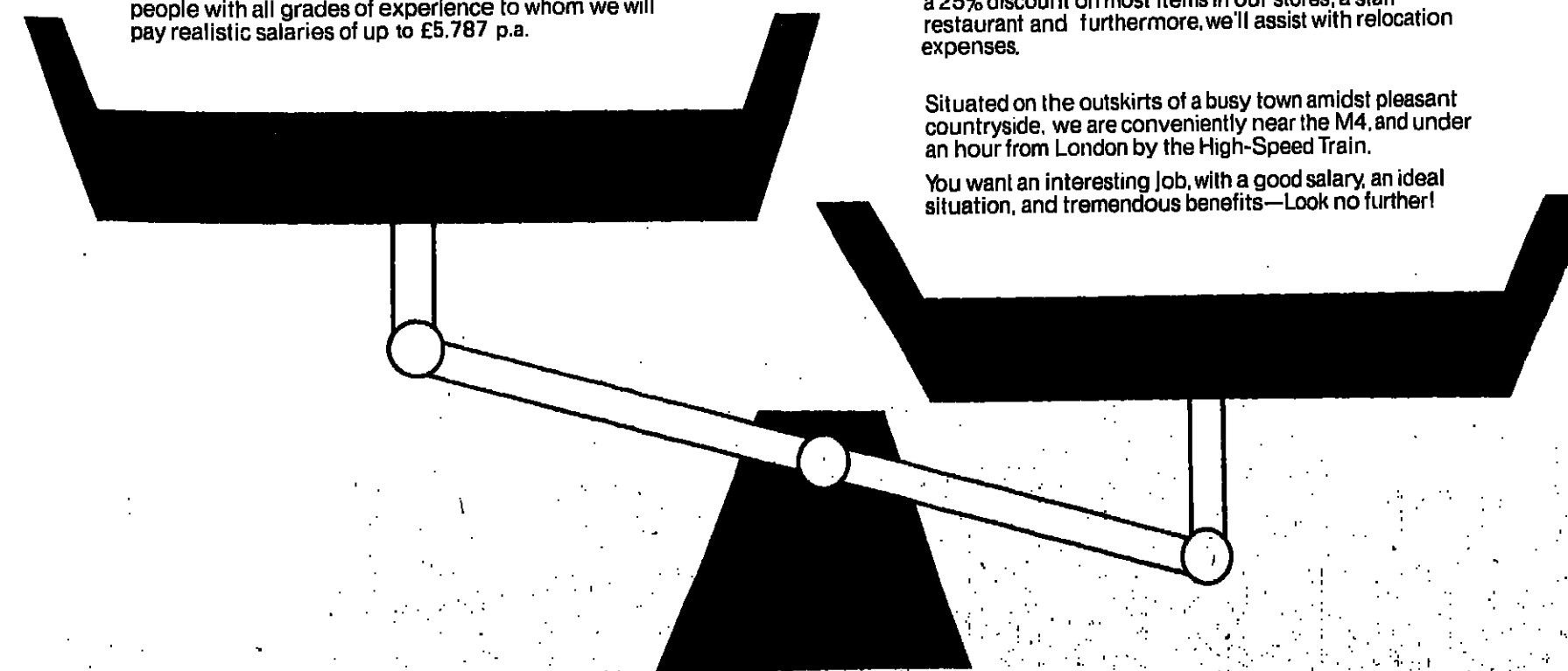
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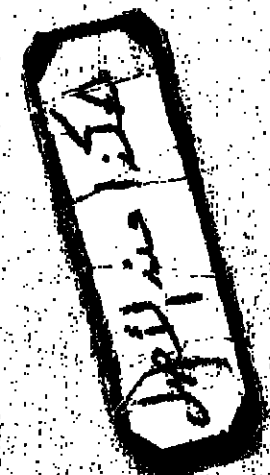
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REF NO 77/0/3

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LONDON 01-935 0671 FREEPOST 6

Freeport 6, 102, Blandford Street, London W1E 1JZ



SCR

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**Linotype
Paul**

Please apply enclosing details to: The Personnel Manager, Linotype-Paul Limited, Lansdown Industrial Est., Cheltenham, Glos. Tel. 38881.

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PLANNED DEVELOPMENT: Some distributed processing experience has been gained, as a result of which a major distributed processing network incorporating a number of minicomputers and employing distributed database management is now planned.

DISTRIBUTED PROCESSING CONSULTANT: The person appointed will have the opportunity to contribute to the establishment of distributed processing strategy and to be involved from an early stage in the development and implementation of the corresponding proposals. He or she will work initially with consultants and will have contacts with appropriate parts of the group, both U.K. and overseas.

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IF YOU ARE ATTRACTED BY THIS OPPORTUNITY AND CONSIDER YOU COULD FIT THE SPECIFICATION, WE WOULD BE PLEASED TO HEAR FROM YOU, QUOTING REF. CW915.



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and in this business, we know a lot of people: users, consultancies, bureaux — in fact, companies from all areas of industry are asking us for experienced personnel at all levels. With our contacts we can put you in touch with the right people regarding the job you're looking for. And at the moment, our clients are seeking more people than ever before. We could fill this whole space with brief, one-line specs; but rather than do that, we have briefly detailed a sample selection below. But remember, we have many, many more jobs than advertised here, in many different locations. So, you could take a lot of the hard work out of job hunting by giving us a call.

BUCKS.

A small but very well known company located in a pleasant rural area currently runs 370 DOS/VS. They need an ANALYST/PROGRAMMER with 2 years' COBOL or RPGII and 18 months' commercial systems design. Work involves design and programming straightforward commercial systems. Salary is in a range up to £4500 p.a.

LONDON

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WEST ESSEX

COBOL PROGRAMMERS and ANALYSTS are sought by this company currently in the process of changing hardware. Systems are presently being developed for the latest type of Honeywell machine and useful experience can be gained. PROGRAMMERS are welcome with 12 months or more on any COBOL, and ANALYSTS should have 3 years' commercial systems design. Salaries are very good — up to £5000 for Programmers and to £6000 for Analysts.

CONTRACTORS

We have a fairly continuous requirement for experienced freelance PROGRAMMERS and OPERATORS. If you are currently free, or will be so shortly, please phone us for further information.

Contact Danny Boreham or Phyllis Irwin on 01-240 3223 or write to them at
COMBYTE, SUITE 74/76, 12/13 HENRIETTA STREET, LONDON WC2E 8LH
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ESSEX

We have a company situated in NE Essex who have requirements for a variety of people. They are using a large IBM OS configuration running both batch and TP applications and can offer a valuable experience in various fields. On the PROGRAMMING side, they would like us to find Programmers with 1 year or more in an IBM-type Assembler or PL/1. Assembler people will be given the opportunity to diversify are really good. They also need experienced ANALYSTS with 3 years' commercial systems design, and ideally some IBM knowledge. If you have experience of financial-type applications, so much the better. In addition to an attractive salary, the offices are new and in a pleasant part of the countryside.

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CLIENTS

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is looking for a

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Salary around £8000
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Extensive PLAN and disc experience and also a working knowledge of ICL COBOL. The successful applicant will have successfully participated in at least one major system. 4 weeks' holiday p.a., 75p LV's per week, staff restaurant, 35-hour week, but start and finish times are flexible; bonus scheme, excellent mortgage assistance scheme after 2 years' service.

Please telephone Personnel 01-580 5544 or write, giving qualifications and experience, to:

The Personnel Manager
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IBM 360/50

Required to work on the Continuum for up to one year and to join an existing team developing ATC simulation facilities. Must be proficient in programming in PL/I and Assembler languages. Working knowledge of a European language is also desirable. Salary from £4,000 per annum by negotiation plus expenses in the region of £7,000-£7,500 per annum overseas allowance.

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Applications are invited from suitably experienced candidates (male/female) who will be involved in the maintenance of existing administrative and financial applications and the development of new applications in these areas. The computer is an ICL 1802A. Applicants should have at least two years' experience of COBOL, preferably on a 1800 series machine with knowledge of discs being an added advantage.

Salary will be in the range to £4,700 per annum according to qualifications and experience. Further particulars and an application form may be obtained from the Registrar, The University, P.O. Box 147, Liverpool L69 3GB. Quote ref. RV/873/CW.

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Head of Management Services
Cope Allman International Ltd.
Leam Gate, Leamington, Warwickshire

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—360/370 COBOL or similar background

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We are the largest U.S. Health Insurance Organisation, and we have dual 370/168's with 450 on-line CRTs. We are involved in an array of sophisticated real-time applications, assuring you of excellent experience and training during your stay with us. We offer competitive salaries based on U.S. rates.

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LONDON INTERVIEWS OCTOBER 10-13
Expenses reimbursed

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The team is at present engaged in developing a new pharmaceutical costing and production system using COBOL and I.B.M. equipment. Within our progressive computer department you would be working directly under the Project Leader at Beeston.

This unique appointment requires a person with wide programming experience and the ambition to develop supervisory management skills.

The position offers a salary to match the responsibility and a range of benefits including a contributory pension scheme, profit sharing scheme, staff discount facilities and assistance with relocation expenses where appropriate.

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The Boots Company Ltd.,
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DATA 100 TERMINAL OPERATOR

Bechtel, a major international engineering and contracting company, makes extensive use of DP techniques throughout its operations and now wishes to appoint an experienced Terminal Operator, man or woman, at its Hammersmith Headquarters.

Work will include the operation of a Data 100 terminal serving both IBM and Univac miniframes and applicants should have at least two years' relevant commercial data processing experience. A Harris 1600 terminal has recently been installed and the successful applicant will be expected, eventually, to move on to this machine.

Alternate shift working will be called for: 8 am - 4.15 p.m. and 10 am - 6.15 pm.

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Write in confidence, giving full details of qualifications and experience, to: Pippa Lindsey, Bechtel International Limited, Bechtel House, 245 Hammersmith Road, London, W6 8DP. Telephone 01-741 6094.

HERTFORDSHIRE COUNTY COUNCIL COBOL PROGRAMMERS

AP. 2/4: £2801-£4124 p.a. Plus Phase II

Vacancies exist in the Planning and Finance Departments for experienced programmers to work on the data processing development team. An ICR Century 251 Computer is currently installed, running under the B4 multi-programming operator system, with the next equipment upgrade planned to take place in the coming year.

A wide range of applications are in use, serving the needs of most Departments within the County Council and the schedule of new development looks towards the further growth of on-line and information systems work, including subjects such as population, employment and land availability.

Candidates should have had two years' successful programming experience, preferably in COBOL. APPLICATION FORMS from County Planning Officer, County Hall, Hertford (Hertford SA242 - Ext. 5173) returnable by 17th October, 1977.

MYRIAD OPERATIONS

Computer Personnel Consultants

OPERATOR

N. LONDON

To £3500

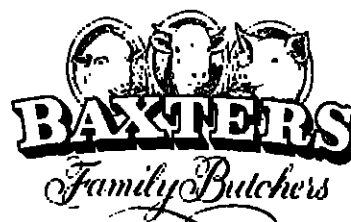
A major manufacturing and marketing organisation is currently seeking to recruit an additional operator for its small yet sophisticated computer centre. A variety of main-frame applications are processed revolving around a mini-based communications network.

You should be able to offer eighteen months' experience on any machine, and be capable of demonstrating considerable initiative since you will be required to work with a minimum of supervision.

In any period of three weeks you will work two day shifts and one evening shift, covering the hours between 9 a.m. and midnight. In addition to the commencing salary a comprehensive range of fringe benefits will be offered, including a staff restaurant and a company product discount purchase scheme.

This is an excellent opportunity for you to progress and join a close-knit team in a small, efficient installation.

Please telephone for a confidential discussion or write:
30 Fleet Street London EC4Y 1AA
01-353 5868



SYSTEMS PROGRAMMING SUPERVISOR

Northampton

The company is a member of the Brooke Bond Liebig Group and the position is at its head office in Northampton.

The Supervisor will be responsible for the operation of the company's new IBM Systems 3 installation and will report direct to the Chief Accountant. Several years' commercial experience and a good knowledge of RPG II is essential.

The person appointed will be the Senior Computer Specialist in the company, and will have ample opportunity to try out new ideas in this expanding field in the company's operations.

The position will be attractive to anyone qualified who is currently earning about £4,400 p.a. and is looking for an opportunity to step out into a new environment and run his/her own show.

The position offers attractive fringe benefits including membership of the Brooke Bond Liebig Pension Scheme. If necessary, some assistance with removal expenses will be available.

Applicants should please send a detailed career history to: Mr. S. Bevan, A.C.A., Chief Accountant, Baxters (Butchers) Ltd., Albion House, Victoria Promenade, Northampton NN1 1HB.

SELECT A JOB!

These vacancies are a very small selection from those held on-line in our computer.

£5,700 S/A (PL/1 & ASSEMBLER) London EC
£6,800 PROJECT LEADER (S/A) Hayes
£8,000 MPU Development Engineer Reading
£7,000 + car SYSTEMS ENGINEER Barks
£5,000 + comm. + car SALES SE/Middle

Call us in confidence for details and interviews

COMPUTECH SYSTEMS & PERSONNEL
168 Finchley Road, London, NW3 6HP

DERRITRON ELECTRONICS LIMITED

the Hastings based leading European designer & manufacturer of electro magnetic vibration testing systems & enlarging its computer science section and has a vacancy for:

MINI-COMPUTER PROGRAMMER

The person will design, write and document specific programs for real time signal analysis and control systems.

He or she must have a minimum of 12 months' experience in assembly code programming, with a degree in a numerical science. The ideal person will be self-motivated with a practical approach to problem solving.

A commencing salary of £4,600 is envisaged. Fringe benefits include contributory pension scheme and 4 weeks' holiday.

Write enclosing brief career and academic details to:

Personnel Manager
DERRITRON ELECTRONICS LIMITED
Sedlescombe Road North
HASTINGS
East Sussex, TN34 3XB

UNIVERSITY OF LONDON COMPUTER CENTRE

A vacancy exists in the NETWORK CONTROL Section

The Centre operates a multi-managed computer service for both London and South East Universities with a large telecommunications network providing access for both batch and interactive terminals. An assistant is required to join a small team supporting this network, including debugging hardware problems, etc. Two shift working is involved.

Applicants should ideally have some relevant data communication or operating experience, although a salary will be considered starting salary in the range £5,124-£5,880 m.c. Applications, stating age, qualifications and experience, should be addressed to: Mr. L. Toward, ULCC, 20 Gifford Street WC1N 1DX.

LEEDS CITY COUNCIL DEPARTMENT OF EDUCATION

Kilnsea College of Technology
Coventry Street, Leeds LS2 3BL
Tel. Leeds 30381

Applications are invited from suitably qualified teachers for immediate appointment or from January 1978, as

LECTURER
Grade 1
DEPARTMENT OF
SCIENCE
& MATHEMATICS

To teach C.O.I. Computer Programming and Computer Science 'A' Level courses. Graduate with experience in COBOL, essential teacher's certificate desirable. Details and forms of application from the Principal at the College to be returned in 10 days.

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to see

OPERATIONS
STAFF

...at most levels,
particularly with IBM
or ICL Hardware.

we want
to see

SENIOR
PROGRAMMERS
& PROGRAMMERS

...with a minimum of
2 years experience.

we want
to see

SYSTEMS ANALYSTS/
DESIGNERS

...with minimum of
3 years experience of
both minis and main
frames at all levels.

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NOTHING
TO LOSE***

KBS Computer Services are looking for top quality personnel to fill vacancies in various parts of the country. We are constantly expanding our placement lists, for further information complete the coupon (NO STAMP NEEDED) and leave it next to us. *Not even the cost of the stamp!

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FREEPOST, Liverpool L14 436.

Name _____
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Position _____
Experience _____
Language _____



KBS COMPUTER SERVICES.
State Insurance Building,
14 Dale St, Liverpool L2 4TH.
Telephone: 051-236 9718

William Key

MIDDLE EAST OPPORTUNITIES

Our client in DUBAI operating in the oil industry has an IBM 370/135 DOS/VS installation with teleprocessing equipment using CICS. COBOL is the programming language.

New developments have created an immediate need for experienced and qualified people.

ANALYST/ PROGRAMMERS

To design, program and implement inventory control applications using the on-line facilities.

SENIOR PROGRAMMER

To write application programmes for existing and the new developments.

These positions offer a challenging prospect with

- ★ 2-year contract
- ★ Excellent tax free salary and allowances
- ★ Relocation expenses for all the family
- ★ Company accommodation and free utilities
- ★ 30 days' annual leave with paid air-fare

(Ref. CW 9518)

For further information and immediate interview please write to or telephone John Goodwell on 01-493 2947 or evenings and weekends Camberley (0276) 22505.

RECRUITMENT CONSULTANT

William Key are seeking an energetic individual to join their London office.

The work includes interviewing candidates, discussing job vacancies with clients and putting forward suitable applicants.

Previous knowledge of personnel recruitment would be an advantage but experience of the computer industry is the main requirement. Expected annual earnings will be in the range of £6-£7000.

Please apply in writing enclosing brief career history to K. R. Jeffreys, Director, in London.

(Ref. CW 9519)

William Key & Partners Ltd., 4 Half Moon Street, London W1
Manchester, 504 Corn Exchange, Corporation Street, M4 3DD



Software Opportunities

We operate a large Univac 1100 installation with remote batch, database and on-line systems. Expansion of our Computer Systems Department, which has centres in the City of London and at Harlow, Essex, has created new opportunities for Programmers and Analyst/Programmers to support and extend these systems. We require:

Analyst/ Programmers

to work on support of DMS 1100 database systems software. Experience of an Assembler language is essential; some experience of database systems is desirable.

Programmers

to work on operating systems support. Univac experience preferred. Consideration will be given to candidates with experience of smaller large systems or those with at least two years' experience in an Assembler language but limited operating systems background.

We offer a competitive salary; other fringe benefits include non-contributory pension scheme, subsidised restaurant and first class social/sports facilities. Please write, giving brief details of age, experience and qualifications, quoting reference P/CB/RY to: The Manager, Central Recruitment, The British Petroleum Company Limited, Britannia House, Moor Lane, London EC2Y 8BU.

First-rate opportunity for senior-level PROGRAMMERS, ANALYST-PROGRAMMERS and SYSTEMS ANALYSTS to gain the invaluable experience of a contract assignment in the United States, earning fees in the range \$20k to \$30k p.a.

OUR CLIENTS

A large manufacturing company located in Connecticut, currently using 370/158s under VM3, OS/VS1 & OS/MFT, with an IMS database, and communications using CICS. They are undertaking major systems development in commercial, management information, personnel and production control areas.

THEY REQUIRE

Computer people at various levels to join project teams on assignments of from 6 mths. to 2 yrs. The main areas of experience they are seeking are as follows: 1. Large machines. 2. Large-scale system development. 3. Database. 4. Communications. 5. COBOL (not necessary for Analysts).

PROCEDURE

Representatives of our clients will be in London at our invitation on October 17th. If you are interested in a contract assignment in USA, contact us without delay so that we can arrange an interview for you. If successful, you will be offered a contract with us and all your travel, accommodation, insurances, etc., will be arranged for you. Throughout your stay in the States, our US representatives will provide local assistance and advice. After the successful conclusion of your US assignment, you will be offered lucrative contract work with us in the UK.

APPLY NOW

If you are a programmer, analyst-programmer or analyst with the kind of background indicated above, and are interested in a contract in America, phone 01-836 8411 WITHOUT DELAY for more information and to register your application.

Computer People Contracts

Associated with the VLI Group
VLI House, 68-69 St. Martins Lane
London WC2N 4JS

tel: 01-836 8411

MULTIBUS

Business has doubled in the last year. To enable us to double again in 1978 we need more:

Experienced Commercial Computer Sales Executives

in: LONDON (North of the Thames) THE HOME COUNTIES
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THE NORTH EAST YORKSHIRE HUMBERSIDE SCOTLAND

We Offer: good basic salaries, generous commission, expenses, pension scheme, product training...

and: a comprehensive fully supported product range used for order processing, accounting, production planning, inventory management in commerce, industry and government.

We Require: experience, ability, dedication.

(PREFERENCE WILL BE GIVEN TO THOSE WITH TERRITORY EXPERIENCE)

ALLIED BUSINESS SYSTEMS LIMITED

MULTIBUS

IF YOU FIT THE BILL
send your C.V. in confidence to
this address for the attention
of the Sales Manager.

London Sales Office:
1 Berkeley Street,
London W1
Telephone: 01-499 9020

Also available - Europe, Africa and North America

Office 101

Operators to Shift Leaders

£2,000-£4,000 (incl.)

LONDON & HOME COUNTIES
We have many vacancies covering all types of machines and locations. Some firms will return from one manufacturer to another. Remember these positions are for shift working only. Hurry while stocks last.
CW40/1, Annette.

Time Sharing Programmers to £6,000

C. LONDON
If you have had time sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four nationally known companies who would offer you an exciting job in a new or post sales support. Some offer generous bonus schemes.
CW40/2, Michael.

Successful Salesmen to £12K quota earnings

U.K.
We now have ten different firms for both hardware and systems only companies who are anxious to meet successful salesmen in this industry. They must have previous relevant small systems experience (some VRCs will be considered). All firms have bonus schemes and cars or car allowance. Most positions in S.E. England, but 2 in Midlands.
CW40/3, Michael.

Junior Programmers £2,500-£3,750

LONDON, HOME COUNTIES
Only one year's experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you.
CW40/4, Annette.

Mini Computer Programmers to £6,950

U.K.
Your experience is required now. A very large number of vacancies are registered where a knowledge of Assembler or communications experience is essential (VRC programmers would also be considered). Opportunities exist in S.W., N.W. or W. London, Surrey, Herts and Manchester in this exciting and rewarding field. There has also been registered some overseas posts to people with 5 or more years in mini computers.
CW40/5, Michael.

Contract Programmers to £190 p.w.

U.K.
Immediate requirements for IBM 573/3 RPG II & IBM COBOL under DOS or OS for C. London. PL/1, OS or CICS, PDP/11 or good IMS for various locations for 3 months plus. Also IBM vacancies in GERMANY, BELGIUM & HOLLAND. Ask for the Contracts Officer on 01-895 2238.
CW40/6, Michael.

Systems Consultants £6,000-£9,500

CENTRAL LONDON
Seven large well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require a first rate service. Technical communications consultants are also required where in-depth implementation experience of IBM or ICL T/P message switching networks etc. are essential. Excellent fringe benefits and prospects.
CW40/7, Michael.



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Recruitment Consultants

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NORTH WEST AREA SALES MANAGER

On quota earnings circa 9K + company car

Our Clients manufacture and market a highly competitive range of computer systems, fully supported by comprehensive software and engineering facilities. They are expanding the commercial division of their operation in the North West of England, and therefore seek candidates with proven sales experience of commercial disk-based systems, to develop the Client base in the North West.

Earnings between £9,000 - £12,000 should be achieved by ambitious candidates, combined with management responsibilities as the business base develops.

For further details:

CONTACT: DAVID WADE ON: 061-833 0676

REF: 77/10/5

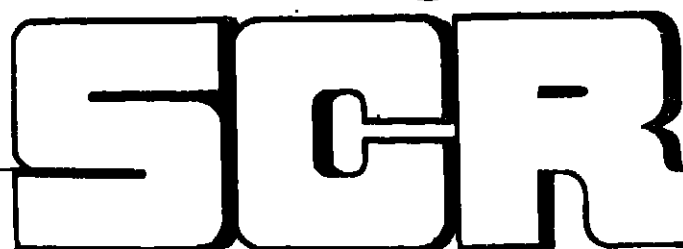
SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST
Freeport, Equiry and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST
Freeport, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0671 FREEPOST 6
Freeport 6, 102, Blandford Street, London W1E 1JZ

Computing
Services
Association



MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

ANALYST/PROGRAMMER RPG II

CITY

A major financial company with offices throughout the world is seeking an Analyst/Programmer to develop an unusual and interesting application using distributed minis, including IBM System 32s, linked to their main IBM installation in the City.

Joining a small team, the Analyst/Programmer will be able to partake in all issues of the systems development to successful implementation.

Excellent prospects of career progression are offered to candidates with sound RPG II programming experience. Knowledge of another language and on-line processing would be an advantage although training will be provided where necessary.

Excellent conditions of employment include Non-contributory Pension, BUPA, LVs and four weeks' holiday.

DEVELOPMENT

PROGRAMMING CONSULTANT 3-4 years' COBOL

W. LONDON

UP TO £6500

We are seeking a Programmer or Analyst/Programmer keen to accelerate his/her career by a move to Team Leading. You will be expected to play a major role in the development of new systems, being responsible for the programming and implementation of projects from specification to overall testing.

The person appointed will have in-depth knowledge of COBOL with an appreciation of commercial data processing. Previous supervisory experience is not essential although a commitment to maintaining high standards of coding and documentation are required.

The Company, a subsidiary of a major international group, offers a friendly environment with the exciting prospects of allowing your career and responsibility to grow with the Company. The offices are conveniently situated to both underground and main line stations.

SYSTEMS ANALYST/ PROJECT LEADER

S.W. LONDON

c. £5750

This is an ideal opening for an experienced Analyst to lead a project team of seven development staff installing a variety of applications on our client's new main-frame.

The Systems Analyst will hold responsibility for planning and scheduling complete systems installation and ensuring that team members adhere to standards and obtain the maximum use of modern techniques using the latest equipment available.

Candidates should have implemented at least one system from inception to completion and be capable of leading a project team.

This is a permanent appointment in a progressive and expanding organisation offering the successful candidate an excellent career path.

Benefits include Pension Scheme, Flextime, four weeks' holiday and LVs.

PROGRAMMERS

CENTRAL LONDON

FROM £4000

If you are able to offer from around twelve months' programming experience in either COBOL or an assembly level language you may well prove a suitable candidate for one of the current programming positions in our client's installation.

The department is currently undergoing a programme of expansion and can offer you the opportunity to become involved with a variety of interesting projects.

New members of the department will be attached to project teams where they will gain valuable experience working on both the developing of new systems and the maintenance and enhancement of existing systems.

The Company offer a very competitive salary range which is further enhanced by a comprehensive benefits package.

Please telephone for a confidential
discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 5868

CERN
European Organization for Nuclear Research
Organisation Européenne pour la Recherche Nucléaire

CERN, a European Research Laboratory situated near Geneva, has vacancies for:

COMPUTER CONSOLE OPERATORS

In its central computer service, this is at present based upon CDC 7800, 6500, 8400 computers and an IBM 370/168 system.

The posts involve shift work including weekends and public holidays.

Candidates should have successfully completed their education to at least GCE "A" level or equivalent preferably including computer science or other scientific subjects. At least two years' experience of computer operation including some IBM experience is desirable. A knowledge of French would be useful.

For application forms, please write to:
Head of Personnel, CERN, 1211 Geneva 23, Switzerland
Quoting the reference DD-CO-77/1

COMPUTER OPERATOR

— NEAR OXFORD CIRCUS

Commencing Salary (including Shift Allowance) up to £3,850 p.a.

We are seeking additional staff with at least 18 months' experience of George 3 and/or OS/VS1 on systems similar to our own.

Our equipment includes an ICL 1904S using George 3 and MOP, on ICL 1904S using George 2 and Maximop, an IBM 370/145 under OS/VS1 to be replaced by a 370/148 by the end of the year.

Valuable fringe benefits including FREE TRAVEL on London Transport services, excellent sports and social facilities and staff restaurant.

If you are interested and would like further information please telephone the Senior Operations Supervisor on (01) 637-9144, or write to: Staff Appointments and Development Officer (Ref. 866/G), London Transport, 56 Broadway, London SW1H 0BD.

LONDON TRANSPORT

Analysts and Programmers

£6,500/£5,000 Oil Industry

Dowell Schlumberger offers specialist technical services to the oil industry world-wide. Part of a major international group, it has a small but powerful computer centre in London. The configuration is an IBM 370/125 256K (which should shortly be up-graded) with local and remote VDU's. Applications are a range of management and financial information systems. Some are already highly sophisticated; others need to be devised and implemented to meet the demands of user departments throughout the world.

These are opportunities for competent Analysts and Programmers to move into a live environment offering considerable challenge and job satisfaction, as well as career progression. Analysts must have big-company TP experience under DOS/VS, and Programmers must be capable of working as expert members of a small team. Salaries will start at £6500 for Analysts and £5000 for Programmers. There are excellent continental standard benefits including an annual bonus.

We invite you firstly to telephone (01-629 1844 at any time) or write to ASL Recruitment Advertising, 17 Stratton Street, London, W1X 8DB, for further information and an application form, quoting ref. FY. 7650.

**DOWELL
Schlumberger**

SITUATIONS WANTED PROGRAMMER

(HND in Computer Studies with Distinction)

seeks suitable positions abroad. Thorough knowledge of COBOL, PLAN, FORTRAN, BASIC, RINO and FILETAB. Experience on BAK ICL 1902T operating under GEORGE II and MAXIMOP. Also has recognised commercial management qualification and experience.

Write to Box 1897, Computer Weekly.

BURBECK COLLEGE PROGRAMMER

The Department of Statistics has a vacancy for a graduate programmer with some statistical knowledge to support research and teaching, act as computing adviser and run the departmental computing facilities, using a 66/700 system and a Wang 2200. Main languages FORTRAN and BASIC.

Initial salary in the range £2828 to £3285 plus London Allowance of £450.

Application forms and further details from the Deputy Secretary (CV), Burbeck College, Maitland Street, London, W51E 7HQ.

EXPERIENCED CORAL OR FORTRAN PROGRAMMERS

required in West London and Hants. The work involves the design and implementation of scientific data analysis programs on mini computers. Applicants should be capable of working largely on their own initiative.

Reply with full details of programming experience and salary required to: 27 High Street, Balfron, Walsden, Essex, CB10 1AT.

Programmer/ Analyst

McEvoy Oilfield Equipment manufacture wellhead assemblies and associated equipment for application in oil and gas fields throughout the world. The Company is pleasantly situated in the Cotswolds, between Stroud and Nailsworth and currently employs 420 people.

We now require a Programmer/Analyst to join a small D.P. team and report directly to the Information Systems Manager.

Applications of the recently installed D.P. function are primarily involved within the manufacturing control area including data base creation, inventory control and material requirements planning.

Applicants should preferably be educated to HND/Degree level, and must have had at least 2 years' programming experience (preferably with ANS cobol and/or BAL) and a min. of 1 year's analytical experience. Knowledge of BOMP/DBOMP or CFMS will be advantageous as would OS/JCL experience.

Fringe benefits include relocation expenses where appropriate.

Letters of application should be brief but include age, present position and salary. A comprehensive application form will subsequently provide full scope for details.

Applications should be marked "Confidential" and addressed to The Personnel Manager, McEvoy Oilfield Equipment Ltd., Woodchester, Stroud, Glos. GL6 5EY.

**McEvoy
OILFIELD
EQUIPMENT
LIMITED**
Woodchester, Stroud, Glos. GL6 5EY
Tel. Nailsworth 2001

RPG II ASSEMBLER HELPFUL

Travel, high pay, interesting shift work.

Call: Diana Gordon on 01-499 8116 or write to: SCAL, 24 Cranbourne Street, London W6E 7AA. Provide application form re-reply.

CAPITAL APPTS

COMPUTER
SERVICES
ENGINEERS
AND
TECHNICAL
STAFF

34 PRINCE
637 5551 day, 495 0511

Our client, a well known name in the motor industry, have assigned us to recruit a number of people for their expanding data processing department.

ONE PROGRAMMER

SUSSEX

Salary neg.

It is expected that candidates have around two years' COBOL experience. Preferably this should have been gained on ICL 1900 equipment although this is not an essential requirement for the position.

The department is currently developing now on-line systems in the area of Accounting, Distribution and Stock Control.

THIS VACANCY IS AIMED AT PROGRAMMERS WISHING TO MAKE AN EARLY MOVE INTO SYSTEMS.

TWO SHIFT LEADERS

£4000 Neg. + overtime

Candidates for these positions should have the ability and experience to organise, develop and control shifts consisting of three people per shift.

Several years' operating experience on ICL 1900 equipment is required plus the ability to work in a demanding and rapidly expanding department.

THESE TWO POSITIONS BOTH CONTAIN EXCELLENT OPPORTUNITIES FOR REGULAR PAID OVERTIME.

TWO OPERATORS

Salary neg.

Two further operators are also required with a minimum 18 months to 2 years GEO II experience.

These positions would later lead to candidates with the ability and potential to become shift leaders.

REGULAR PAID OVERTIME WOULD BE AVAILABLE FOR BOTH THESE POSITIONS.

Our client has an excellent benefits package which includes:

CAR PURCHASE SCHEME — FLEXIBLE WORKING HOURS (FOR THE PROGRAMMING VACANCY) — STAFF RESTAURANT — FOUR WEEKS' HOLIDAY.

RECRUITMENT RESOURCES LIMITED

For more information and to arrange an informal interview ring **STUART WINFIELD** on 01-438 9817 or write to: 2 GREAT MARLBOROUGH ST., LONDON W1V 1DE after office hours 01-438 3933

Computing Services Association

DISTRIBUTED PROCESSING SYSTEMS

SUPPORT MANAGER

MIDLANDS and LONDON

to £7,000 + Benefits

The modish concept of decentralising computing power among small remote processors has been the essence of this clients market strategy for some years now. Their not inconsiderable reputation as one of the leading manufacturers of mini computers for the commercial market place is based upon the technical performance of a first-class product range, backed up by a thoroughly professional support team.

They are looking for two experienced and mature people to strengthen the support groups. These positions require experience of a support function within a manufacturer or systems house; the ideal candidates will have had some exposure in a team leading/project managing role. Experience of intelligent distributed systems or real time minis is desirable. One position is BIRMINGHAM based and carries responsibility for pre- and post-sales support in the area.

The other position is LONDON based and will concentrate on pre/post sales support to Major Accounts and Government clients.

**hutchinson-scoggins
recruitment**

10 Dover Street London W1X 3PH Telephone 01-499 4501

Apply via 1.34

Programmer to £5,000
MID-BUCKS
Have your COBOL or ASSEMBLER programming experience (any byte machine)? If you do then this Finance Organisation using the latest Univas equipment would like to see you. Terrific perks including a subsidised canteen, N.C.P.S. free life assurance, 4 weeks' holidays and a swimming pool on the premises CW40/12, Annette.

Analyst Programmer £5,000 to £6,000
W. MIDDLESEX
A go-ahead profitable Service Bureau using on-line systems based around a Burroughs computer requires applicants with COBOL, plus extensive commercial and project management experience. Company benefits include Flextime, canteen and sports facilities CW40/9, Annette.

Hardware & Test Engineers £4,000 to £6,000 +
HERTS & MIDDLESEX
Seven companies situated around W & N.W. London require first-rate Engineers who have run or maintain hardware design experience. Six vacancies also exist for Test Engineers with 18 bit and 32 bit micro experience and relevant testing background. Perks in some cases include a car and expenses CW40/10, Michael.

Field Engineers to £5,000
LONDON AND HOME COUNTIES
We now have eight manufacturers of mine and mainframe requiring Field Service Engineers. Some firms offer excellent overtime payments and bonuses, etc. CW40/11, Michael.

Systems Analyst c £6,000
W. LONDON
A major food group is engaged on extensive expansion plans involving T.S.O. and IMS on its large IBM installation. A user liaison analyst with some T.P. experience is urgently required to simulate and design systems from a number of IBM 3790 terminals at subsidiary offices. Perks include 4 to 5 weeks' holidays and free lunches CW40/12, Annette.

O & M Analyst £6,000
NORTHOLT
A medium sized consumer manufacturing firm soon to install an IBM computer needs good production control experience to help maintain this company as a leader in its field. Perks include 4 weeks' holiday and a generous pension scheme CW40/13, Annette.

Senior Systems Analyst c £6,500
NR STAINES
If you have ICL financial and commercial systems experience and like to be in charge, then this position could be for you. The firm is part of a large manufacturing group with a secure future. CW40/14, Annette.

Assistant to D.P.M. to £7,500
W. LONDON
Applications are required from all round experienced analyst programmers to work for a Petro-Chemical company using a large CDC computer. Technical experience should include COBOL and FORTRAN but most important is the ability to deal with users and advise and design new systems. N.C.P.S. Free Life Insurance, 3 weeks' holidays CW40/18, Annette.

Systems Analyst to £6,950
VICTORIA
Have you designed and installed a major system on a large computer (IBM preferred)? If you have then the famous Petro-Chemical company would be very interested in seeing you. New and improved Business Reporting applications await you. Company benefits include 4 weeks' holiday. Free Life Insurance, C.P.S. and L.V.A. CW40/18, Annette.

Systems Analyst to £6,950
VICTORIA
Have you designed and installed a major system on a large computer (IBM preferred)? If you have then the famous Petro-Chemical company would be very interested in seeing you. New and improved Business Reporting applications await you. Company benefits include 4 weeks' holiday. Free Life Insurance, C.P.S. and L.V.A. CW40/18, Annette.

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